INSTALLATION RESTORATION PROGRAM

PRELIMINARY ASSESSMENT

Gulfport Air National Guard Field Training Site
Gulfport - Biloxi Regional Airport
Gulfport, Mississippi

AIR NATIONAL GUARD

HAZWRAP SUPPORT CONTRACTOR OFFICE
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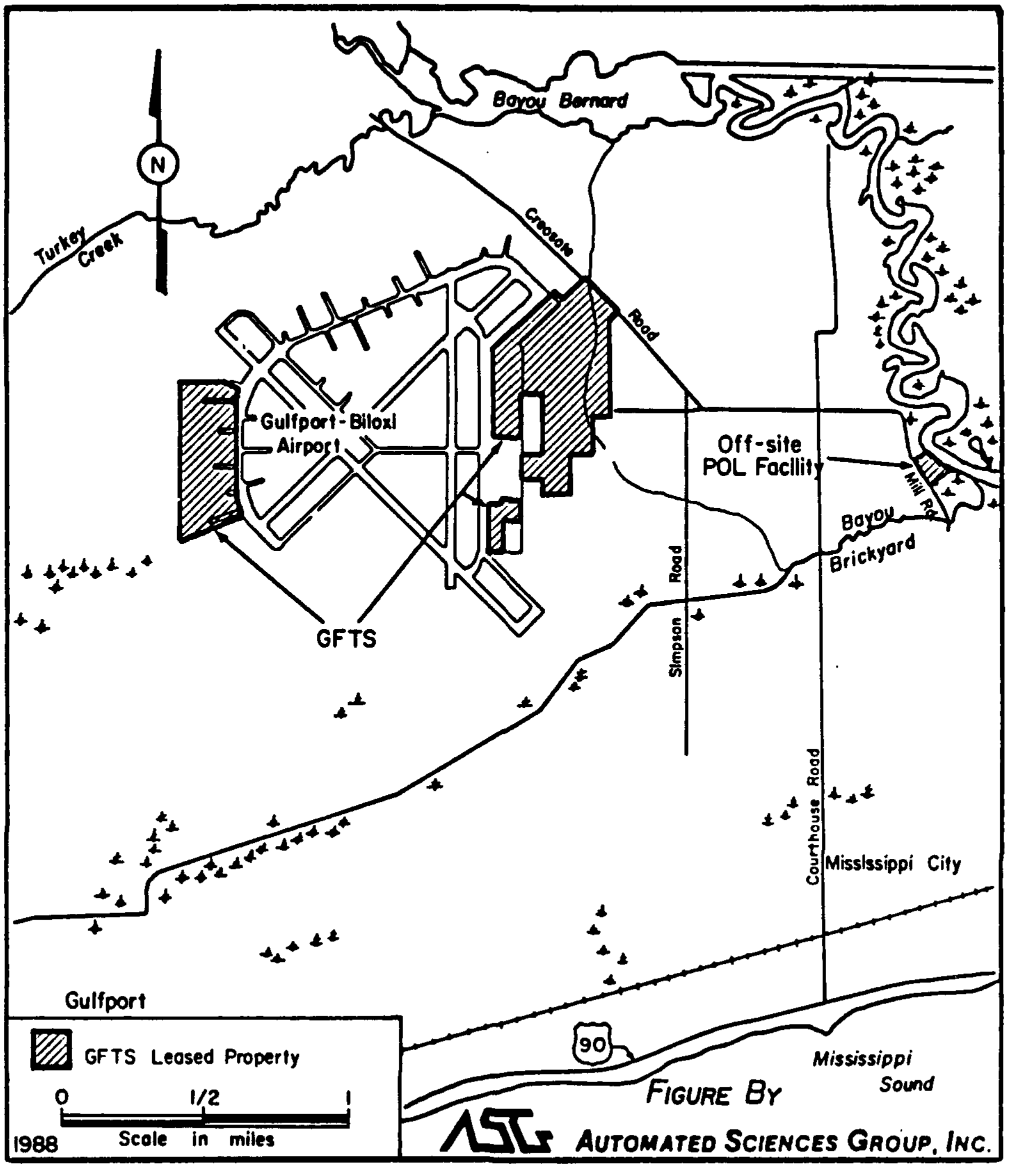

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Preliminary Assessment of suspected hazardous waste sites at the Gulfport Air National guard Field Training Site, Gulfpor-Biloxi Regional Airport, Gulfport, Mississippi. The study was conducted under the Air National Guard's Installation Restoration Program.

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INSTALLATION RESTORATION PROGRAM

PRELIMINARY ASSESSMENT

OF THE

GULFPORT AIR NATIONAL GUARD FIELD TRAINING SITE

GULFPORT-BILOXI REGIONAL AIRPORT

GULFPORT, MISSISSIPPI

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EXECUTIVE SUMMARY

A. INTRODUCTION

The Automated Sciences Group, Inc. (ASG) was retained by the HAZWRAP Support Contractor Office (SCO) in April 1988 to conduct the Preliminary Assessment (PA) phase of the Installation Restoration Program (IRP) of the Gulfport Air National Guard Field Training Site (GFTS), Gulfport-Biloxi Regional Airport, Gulfport, Mississippi, under contract No. DE-AC05-87OR21642. The Preliminary Assessment included the following:

- An onsite visit that included interviews with 20 past and present Training Site personnel and one city employee conducted by ASG personnel from 19-22 July 1988.
- The acquisition and evaluation of pertinent information and records on industrial chemical usage and storage, fuel and lubricants usage and storage, and past waste generation and disposal at the Training Site.
- The acquisition and evaluation of available geologic, hydrologic, meteorologic, and environmental data from pertinent federal, state, and local agencies.
- The identification and assessment of sites on the Field Training Site that may have been contaminated with hazardous materials/wastes.

B. MAJOR FINDINGS

The major operations of the Training Site that have used and disposed of hazardous materials/wastes include:

- aircraft maintenance;
- aerospace ground equipment (AGE) maintenance;

- ground vehicle maintenance;
- petroleum, oil, and lubricant (POL) management and distribution; and
- fire department training.

These operations involve such activities as corrosion control, jet engine maintenance, and hydraulics repair. Waste oils, contaminated fuels, paint wastes, spent cleaners, acids, strippers, and solvents are generated and disposed of by these activities.

Interviews with 20 personnel associated with the Training Site and one city of Gulfport employee, analysis of pertinent information and records, and a field survey resulted in the identification of three disposal and/or spill sites that are potentially contaminated with hazardous materials/wastes resulting from Air National Guard (ANG) operations. A Hazard Assessment Score (HAS) utilizing the U.S. Air Force Hazard Assessment Rating Methodology (HARM) was assigned to all of the potential sites for contamination. The three sites identified were:

- Site No. 1 - Fire Training Area
- Site No. 2 - Bulk Aviation Fuel Storage Area on Mill Road
- Site No. 3 - Above-ground Diesel Fuel Storage Tank, Bldg. 68

Site Location Maps are included on pp. IV-5, IV-7, and IV-10.

C. CONCLUSIONS

The three sites identified as being potentially contaminated are considered to have the potential for contaminant migration.

<u>Site No. 1 - Fire Training Area (HAS-74)</u>

The Fire Training Area is still active. Written records on the FTA do not exist, and all information obtained during personnel interviews was from the

memories of GFTS personnel. The pit is definitely known to have been in operation since 1972 and has probably been in use since 1954. There was no recollection of there ever having been another FTA in use by the GFTS. The GFTS has been conducting fire training exercises since 1954. Recent usage of the fire training area has been one to two events per month, with two to four burns per event. It is estimated that between 400 and 500 gallons of jet fuel (JP-4) is used per burn. If no water is present in the burn area at the time of an exercise, a water base is applied to the pit prior to the addition of fuel for the burn. After the last burn, the remaining fuel is left unburned in the pit area. This Site is being considered due to the possibility that a portion of the flammables (estimated to be 30 percent) remained on the ground either to infiltrate into the soil or to run off into surface drainage ditches.

Site No. 2 - Bulk Aviation Fuel Storage Area on Mill Road (HAS-66)

The bulk aviation fuel storage area for the Training Site is located on leased property along Bayou Bernard approximately one mile east of the GFTS proper. This Site was considered in terms of two stages of operations--AVGAS storage from circa 1943 to 1974 and jet fuel (JP-4) storage from 1973 to present.

Two 25,000 gallon above-ground AVGAS tanks were constructed on the Site during World War II for use by the U.S. Army Air Corps. These tanks were turned over to the GFTS in 1952 and used for AVGAS (115/145) storage until 1970. They were dismantled in 1973 and 1974. No AVGAS has been stored on site since 1974. A 440,000 gallon above-ground JP-4 fuel storage tank was constructed on the Site in 1973 to supply fuel for flightline operations at the GFTS.

Potential for environmental contamination resulting from each stage of usage (AVGAS and JP-4 Storage) is the result of two related activities: routine discarding of condensed moisture (fuel-contaminated water) drained from the tanks and removal of fuel sludge from the storage tanks during periodic tank cleaning activities. In both cases, wastes were discarded within the bermed areas of the tanks. Condensation was typically discarded directly to the

ground. The sludge from the tank cleaning operations was typically spread on the ground for evaporation of volatile components with the residue being buried close to the surface within the bermed area. It is estimated that up to one gallon per day per tank of condensed moisture has been drained onto the soil in the immediate vicinity of each of these three tanks. At this rate of release, an estimated 19,700 gallons of water contaminated with AVGAS may have possibly been released at this facility over the 27-year time period that AVGAS was stored here while an estimated 5500 gallons of water contaminated with JP-4 fuel may have been released during the 15 years that the JP-4 fuel storage tank has been in use. Assuming that the condensed moisture was 98% water, an estimated 400 gallons of AVGAS and 110 gallons of JP-4 fuel may have infiltrated into the soil at this site. Additionally, a 2000 gallon AVGAS spill occurred at this facility in the mid-60s with an estimated 95% of this spill either evaporating or being flushed into the storm drainage system.

Due to the potential threats to local surface- and ground-water pathways by possible contaminant releases at the old POL fuel storage area, a HAS was applied. A relatively shallow water table was the contributing factor to the ground-water susceptibility. Local surface water and recreational coastal inlets could also potentially be affected if contamination is present at this Site. Bayou Bernard is estimated to be within 200 feet of this facility.

Site No. 3 - Above-ground Diesel Fuel Storage Tank, East of Bldg. 68 (HAS-70)

A 5000 gallon above-ground fuel storage tank located to the east of Building 68 has been used by the Motor Pool since 1954. The tank was used for MOGAS storage until 1981 when it was converted to diesel fuel storage. This tank is refilled 18 to 24 times per year. The fuel from this tank is dispersed in 600 to 1200 gallon aliquots to support GFTS activities. Ground discolorations were noted in the immediate vicinity of this above-ground diesel fuel tank. These appear to have been caused by minor spills that have occurred during refueling operations over the years.

A precise determination of the total quantity of MOGAS/diesel fuel released at this Site could not be accurately determined. Two hundred refueling operations (600 gallon aliquots) could occur under maximum fuel usage each year. If one-half gallon of fuel is spilled during each fuel transfer operation, then an estimated 3400 gallons of fuel (MOGAS and diesel) may have been released at this Site since 1954.

A HAS rating was applied to this Site based on this assumption and because of the potential threats to the local surface- and ground-water pathways by possible contaminant releases.

D. RECOMMENDATIONS

These sites have been identified as potentially contaminated with hazardous materials/wastes and that migration of these materials to ground-water supplies is possible. Therefore, initial investigative stages of the IRP Site Inspection (SI) are recommended for all three Sites.

I. INTRODUCTION

A. BACKGROUND

Gulfport Air National Guard Field Training Site

The Gulfport Air National Guard Field Training Site (GFTS) was established in 1952 on property previously used by the U.S. Army Air Corps (USAAC) during World War II. Use of the site for training purposes began in 1954. It is located at the Gulfport-Biloxi Regional Airport within the city limits of Gulfport, Mississippi. Two air-to-ground tactical bombing and gunnery ranges are located at Camp Shelby, an Army National Guard (ARNG) training facility, 40 miles due north of the main Training Site. The GFTS occupies 211 acres and employs 56 Active Duty Guard and Reserve (AGR) military personnel and 34 permanent and 15 temporary state of Mississippi employees. The average daily population of GFTS during times of use by deployed ANG units is 500, including tenant unit personnel. The Site is host to the 255th Tactical Control Squadron, Army National Guard Aviation Classification Repair Activity Depot (AVCRAD; a helicopter repair shop), and the 173rd Civil Engineering Squadron. More detailed information on the background and history of the GFTS is provided in Section II.

The Installation Restoration Program*

The Department of Defense (DOD) Installation Restoration Program (IRP) is a comprehensive program designed to:

- o identify and fully evaluate suspected problems associated with past hazardous waste disposal and/or spill sites on DOD installations, and

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* The Army AVCRAD operation and the East and West Ranges at Camp Shelby are not a part of this scope of work. The Army will conduct a similar program during the last quarter of 1988 in coordination with the Adjutant General (AG) from the state of Mississippi.

- o control hazards to human health, welfare, and the environment that may have resulted from these past practices.

During June 1980, DOD issued a Defense Environmental Quality Program Policy Memorandum (DEQPPM 80-6) requiring identification of past hazardous waste disposal sites on DOD installations. The policy was issued in response to the Resource Conservation and Recovery Act of 1976 (RCRA) and in anticipation of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA, Public Law 96-510) commonly known as "Superfund". In August 1981, the President delegated certain authority specified under CERCLA to the Secretary of Defense via Executive Order EO 12316. As a result of EO 12316, DOD revised the IRP by issuing DEQPPM 81-5 on December 11, 1981, which reissued and amplified all previous directives and memoranda.

Although the DOD IRP and the USEPA Superfund programs were essentially the same, differences in the definition of program phases and lines of authority resulted in some confusion between DOD and state/federal regulatory agencies. These difficulties were rectified via passage of the Superfund Amendments and Reauthorization Act (SARA, PL-99-499) of 1986. On January 23, 1987, Presidential Executive Order EO 12580 was issued. EO 12580 effectively revoked EO 12316 and implemented the changes promulgated by SARA.

The most important changes effected by SARA included the following:

Section 120 of SARA provides that federal facilities, including those in DOD, are subject to all the provisions of CERCLA/SARA concerning site assessment, evaluation under the National Contingency Plan (NCP) [40 CFR 300], listing on the National Priorities List (NPL), and removal/remedial actions. DOD must therefore comply with all the procedural and substantive requirements (guidelines, rules, regulations, and criteria) promulgated by the USEPA under Superfund authority.

Section 211 of SARA also provides continuing statutory authority for DOD to conduct its IRP as part of the Defense Environmental Restoration Program (DERP). This was accomplished by adding Chapter 160, Sections 2701-2707 to Title 10 United States Code (10 USC 160).

SARA also stipulated that terminology used to describe or otherwise identify actions carried out under the IRP shall be substantially the same as the terminology of the regulations and guidelines issued by the USEPA under their Superfund authority.

As a result of SARA, the operational activities of the IRP are currently defined and described as follows:

Preliminary Assessment (PA) - A records search designed to identify and evaluate past disposal and/or spill sites which might pose a potential and/or actual hazard to public health, welfare, or the environment.

Site Inspection/Remedial Investigation/Feasibility Study (SI/RI/FS) - The SI consists of field activities designed to confirm the presence or absence of contamination at the sites identified as a result of the PA. The RI consists of field activities designed to quantify the types and extent of contamination present, including migration pathways.

If applicable, a public health evaluation is performed to analyze the collected data. Field tests are required which may necessitate the installation of monitoring wells or the collection and analysis of water, soil, and/or sediment samples. Careful documentation and quality control procedures, in accordance with CERCLA/SARA guidelines, ensure the validity of data. Hydrogeologic studies are conducted to determine the underlying strata, ground water flow rates, and probable direction of contamination migration. The findings from these studies result in the selection of one or more of the following options:

- No further action - Investigations do not indicate harmful levels of contamination and do not pose a significant threat to human health

or the environment. The site does not warrant further IRP action and a Decision Document (DD) will be prepared to close out the site.

- o Long-term monitoring - Evaluations do not detect sufficient contamination to justify costly remedial actions. Long-term monitoring may be recommended to detect the possibility of future problems.

- o Feasibility Study - Investigations confirm the presence of contamination that may pose a threat to human health and/or the environment, and some form of remedial action is indicated. The Feasibility study is therefore designed and developed to identify and select the most appropriate remedial action. The FS may include individual sites, groups of sites, or all sites on an installation. Remedial alternatives are chosen according to engineering and cost feasibility, state/federal regulatory requirements, public health effects, and environmental impacts. The end result of the FS is the selection of the most appropriate remedial action by the ANG with concurrence by state and/or federal regulatory agencies.

Remedial Design/Remedial Action (RD/RA) - The RD involves formulation and approval of the engineering designs required to implement the selected remedial action. The RA is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated ground water, installing a new water distribution system, and in-situ biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the remedial actions have been completed, a long-term monitoring system may be installed as a precautionary measure to detect any contaminant migration or to document the efficiency of remediation.

Research and Development (R&D) - R&D activities are not always applicable for an IRP site, but may be necessary if there is a requirement for

additional research and development of control measures. R&D tasks may be initiated for sites that can not be characterized or controlled through the application of currently available, proven technology. It can also, in some instances, be used for sites deemed suitable for evaluating new technologies.

Immediate Action Alternatives - At any point, it may be determined that a former waste disposal site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminant. Immediate actions, such as limiting access to the site, capping or removing contaminated soils, and/or providing an alternate water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or long-term monitoring. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

B. PURPOSE

The purpose of this IRP Preliminary Assessment is to identify and evaluate potential sites associated with past waste handling procedures, disposal sites, and spill sites on the Training Site, and to assess the potential for the migration of contaminants. The ASG site team visited the Training Site, reviewed existing environmental information, analyzed records concerning the use and generation of hazardous materials/wastes, and conducted interviews with past and present Training Site personnel who are familiar with past hazardous materials management activities. Relevant information collected and analyzed as a part of the PA included the history of the Training Site, with special emphasis on the history of the shop operations and their past hazardous materials/waste management procedures; the local geological, hydrological, and meteorological conditions that may affect migration of potential contaminants; local land use, public utilities, and zoning requirements that affect the potential for exposure to contaminants; and the ecological settings that indicate environmentally sensitive habitats or evidence of environmental stress.

C. SCOPE

The scope of this Preliminary Assessment is limited to the identification of past disposal procedures and/or spill sites on the Training Site or on property for which the Air National Guard was the sole user, and includes:

- o an onsite visit;
- o the acquisition of pertinent information and records on hazardous materials use and past hazardous waste generation and disposal practices at the Training Site in order to establish the source and characteristics of hazardous wastes or spills;
- o the acquisition of available geologic, hydrologic, meteorologic, land use and zoning, critical habitat, and utility data from various federal, state (Mississippi), and local agencies in order to establish potential pathways and receptors of hazardous wastes or spills;
- o a review and evaluation of all information obtained; and
- o the preparation of a report.

The on-site visit, interviews with past and present Training Site personnel, and meetings with local agency personnel were conducted during the period 18-22 July 1988. The ASG effort was conducted by the following individuals.

- o Mr. David R. Styers, Chemist/Civil Engineer/Health Physicist;
- o Mr. Richard J. Burtnett, Aerospace Safety Engineer;
- o Mr. Harry A. Bryson, Environmental Engineer;
- o Ms. Susan Carr, Field Engineer (Civil); and
- o Mr. Ward Dilworth, Civil Engineer/Geologist.

Resumes are included as Appendix A.

Individuals from the ANG Support Center and the GFTS who assisted in the PA include:

- o Mr. Don Williams, Project Officer, Environmental Engineer, ANGSC/DER;
- o LTC Thomas Robey, Base Civil Engineer, MSANG; and
- o Other selected members of the MSANG.

The Training Site Point of Contact was LTC Tom Robey, Base Civil Engineer.

D. METHODOLOGY

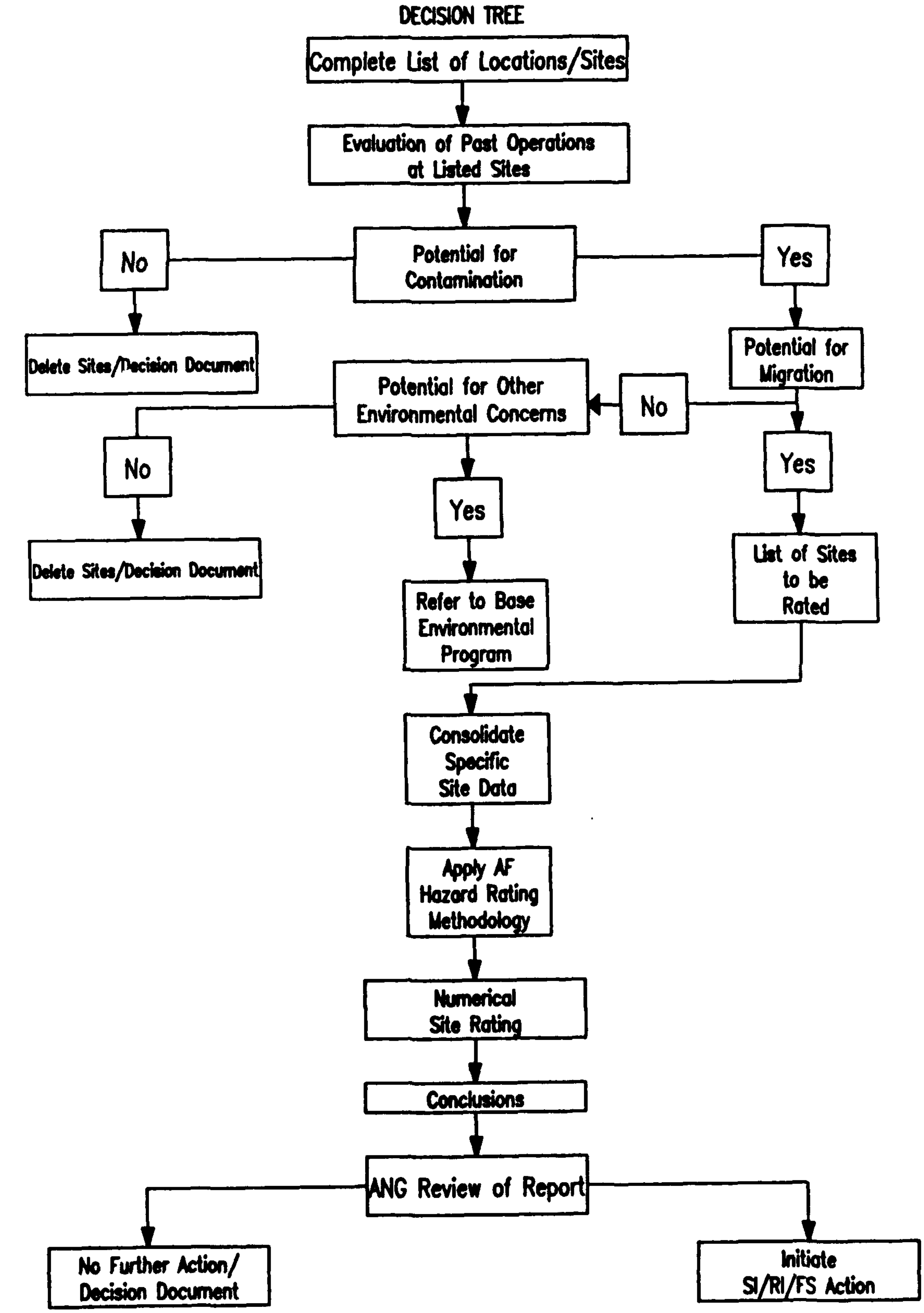
A flow chart of the IRP Preliminary Assessment Methodology is presented in Figure 1. This Preliminary Assessment Methodology, to the greatest extent possible, ensures a comprehensive collection and review of pertinent site specific information and is utilized in the identification and assessment of potentially contaminated hazardous waste spill/disposal sites.

The Preliminary Assessment began with a site visit to the Training Site to identify all shop operations or activities on the installation that may have utilized hazardous materials or generated hazardous wastes. Next, an evaluation of past and present hazardous materials/wastes handling procedures at the identified locations was made to determine whether environmental contamination may have occurred. The evaluation of past practices was facilitated by extensive interviews with 20 past and present GFTS personnel with an average tenure of 20 years with the various operating procedures at the Training Site in addition to a state of Mississippi employee and a Gulfport city employee. These interviews were also utilized to define the areas on the Training Site where any waste materials, either intentionally or inadvertently, may have been used, spilled, stored, disposed of, or released to the environment in order to establish potential pathways for migration.

INSTALLATION
RESTORATION PROGRAM

PRELIMINARY ASSESSMENT

Figure 1
Methodology Flow Chart



Very little historical information was found in the Training Site files. Hence, most information was obtained from interviews. Using the information outlined above, a list of past waste spill/disposal/storage sites on the Training Site was compiled for further evaluation. A general survey tour of the Training Site and leased properties, previously identified potential spill/disposal/storage sites, and the surrounding area was conducted to determine the presence of visible contamination and to help assess the potential for contaminant migration. Particular attention was given to locating nearby drainage ditches, surface water bodies, residences, and wells in order to establish potential pathways for migration.

Detailed geologic, hydrologic, meteorologic, developmental (land use and zoning), and environmental data for the area of study were also obtained from appropriate federal, state, and local agencies as identified in Appendix B for the purpose of establishing potential receptors of hazardous wastes or spills. Following a detailed analysis of all the information obtained, three sites were identified as potentially contaminated with hazardous materials resulting from past GFTS operations. Sites were numerically scored by using the Air Force Hazard Assessment Rating Methodology (HARM). A description of HARM is presented in Appendix C. Hazardous Assessment Rating Forms for the three potentially contaminated sites are presented in Appendix D. Appendix E is a list of storage tanks located within the GFTS leased boundaries. Appendix F presents copies of some soil boring logs taken from subsurface investigations that have taken place on the Training Site.

II. INSTALLATION DESCRIPTION

A. LOCATION

The Gulfport Air National Guard Field Training Site (GFTS) is located at the Gulfport-Biloxi Regional Airport, approximately 5 miles east of central downtown Gulfport. (See Figure 2 for site location and Figure 3 for the immediate surrounding area). In Figure 4, Buildings/facilities owned by the GFTS are blacked in while non-GFTS buildings/facilities are outlined only. The city of Gulfport is located in the south-central portion of Harrison County adjacent to the Gulf of Mexico.

B. ORGANIZATION AND HISTORY

The original establishment of the Gulfport-Biloxi Regional Airport began in 1941-42 as an Army Airfield Pilot Training Center on lands acquired by the City of Gulfport and leased to the United States Government. In 1949, the airfield was released back to the City. In 1952, the Air National Guard leased approximately 207 acres of land from the city of Gulfport. In 1971, a host/tenant agreement was signed whereby use of a portion of this land (approximately 9 acres) was transferred to the Army for a helicopter repair facility (AVCRAD). The Training Site has leased an additional 33 acres from the Airport Authority near Washington Avenue and Hewes Avenue for a military fuel depot (now under construction - 1988).

The peacetime mission of the GFTS is to provide a complete training facility for Air National Guard and other DOD flying units. In wartime, the GFTS is tasked to serve as a dispersal and/or staging area and to support contingency plans. The GFTS was established in 1954 to support operations of deployed Air National Guard units. In 1963, the detachment at the Training Site was expanded when the 173rd Air Base Squadron (ABS) was established. In 1971, the 173rd ABS unit was converted to the 225th Combat Communications Squadron (CCS), and another unit, the 173rd Civil Engineering Squadron (CES), was established. In 1987, the 225th CCS was redesignated as the 255th Tactical Control Squadron. All tenant units at the Training Site

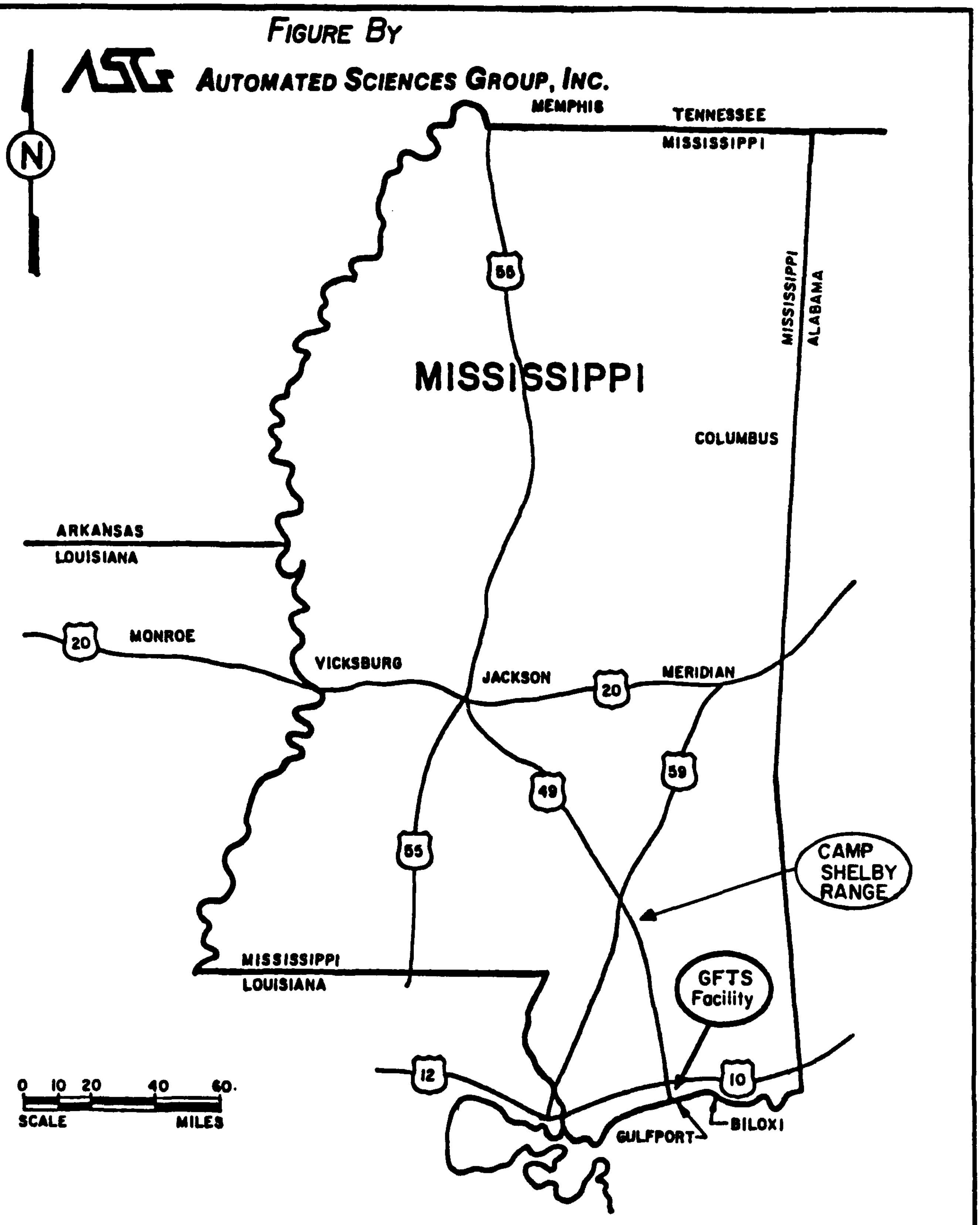


Figure 2. Site Location Map for ANG Field Training Site at Gulfport-Biloxi Regional Airport (1988).

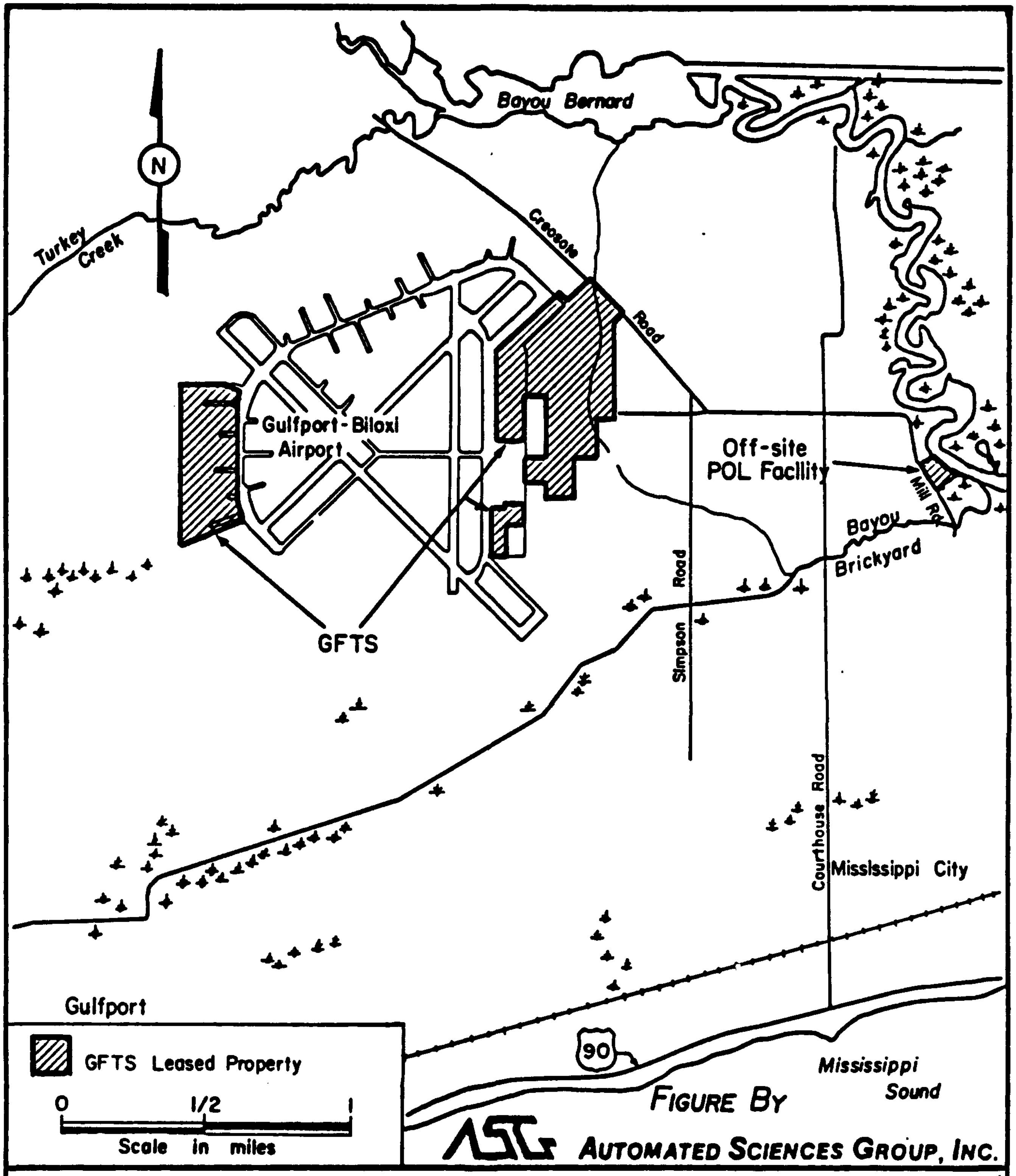


Figure 3. Air National Guard Field Training Site at Gulfport-Biloxi Regional Airport and Immediate Surrounding Area of Gulfport, Mississippi (1988).

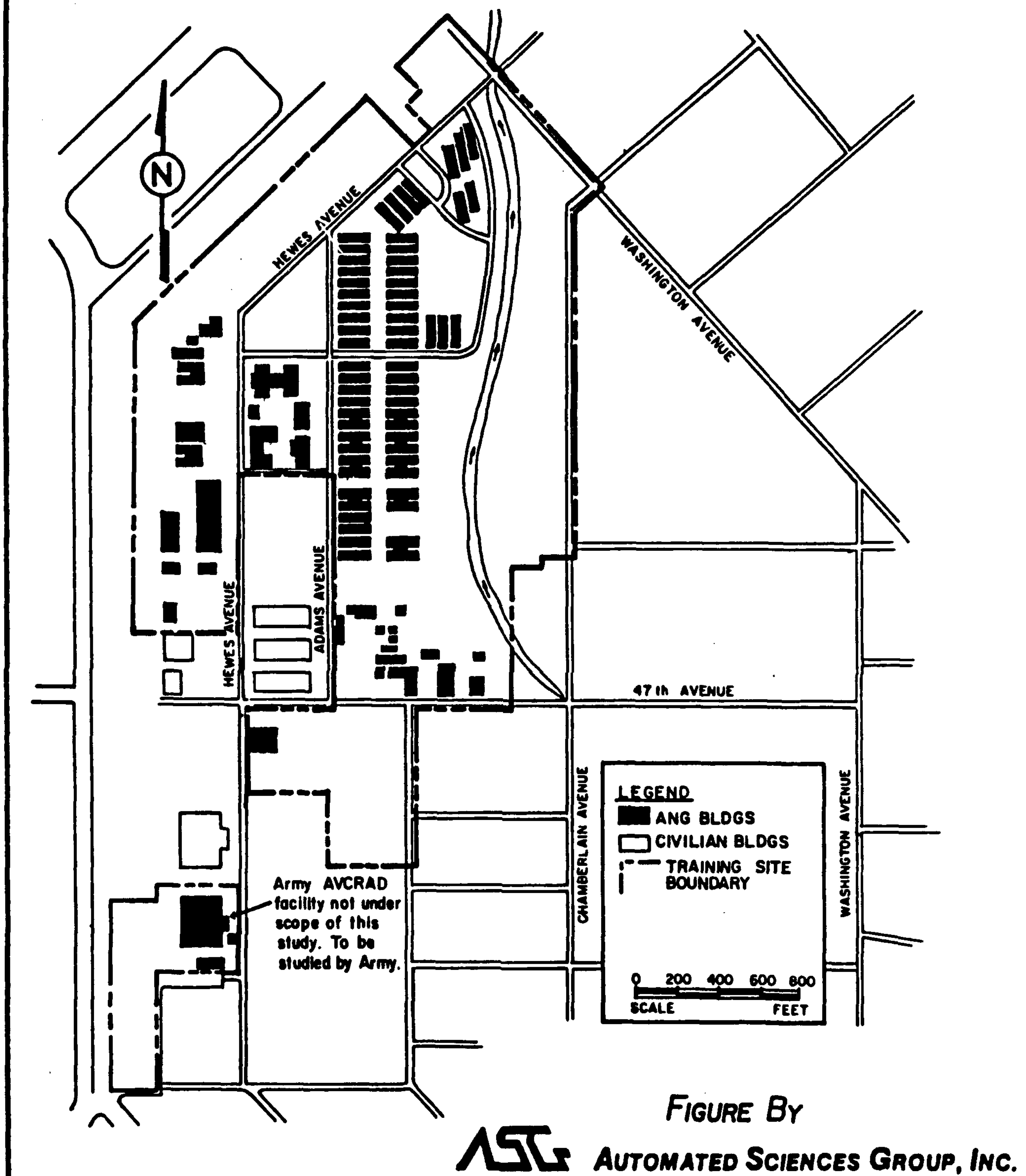


Figure 4. Air National Guard Field Training Site at Gulfport-Biloxi Regional Airport in Gulfport, Mississippi (1988).

are substantially supported as geographically separated units by the 172nd Military Airlift Group, Mississippi Air National Guard, Jackson, Mississippi. GFTS is self-supported.

Over the years the types of military aircraft based and serviced at GFTS varied and included both piston and turbine powered aircraft. Both past and present operations have involved the use of potentially hazardous materials and the disposal of wastes. No records exist at the GFTS regarding specific aircraft operations, fire training activities, civil engineering training, or any other training. Deployments by individual Air National Guard units over the years have typically been for two weeks or less. During these deployments, aircraft operations consisted of servicing (refueling, arming, etc.) and field maintenance. Waste generating operations of an industrial nature typically performed at the aircraft units' home bases were not performed at the GFTS (e.g., Metal Plating, Aircraft Washing, aircraft and ground equipment painting and paint stripping).

Fire fighting activities are regularly conducted for training of visiting unit fire department personnel. The FTA is currently utilized for training one to two times per month, with two to four "burns" per event. Approximately 400 to 500 gallons of fuel are used per burn. Past usage (since 1954) of the FTA has probably been similar.

Civil engineering activities have typically involved routine construction work (single or two story building construction and renovation) and roads and grounds earthwork and paving. Wastes generated by there activities are construction rubble from demolition and non-hazardous solid waste in the form of scrap/waste construction materials. This material is disposed of by a local contractor who hauls such wastes to a local landfill.

The GFTS maintains a fleet of vehicles for use by deployed units. Included are refuelers, general purpose vehicles, carry-alls, and buses. A large quantity of common Aerospace Ground Equipment (AGE) is maintained and prepositioned.

During the Fiscal Year 1985-1987 period, the GFTS supported the following number of units:

- FY85 - 45 Units (29 Flying Units) 15,947 Personnel
- FY86 - 32 Units (22 Flying Units) 17,968 Personnel
- FY87 - 40 Units (21 Flying Units) 16,239 Personnel

On the average, the GFTS is used 325 days per year with about 95 percent of this use being from visiting ANG units.

For fighter training, a large supersonic air-to-air training area is located over the Gulf of Mexico, 40 miles southeast of the GFTS. There are many air-to-ground ranges in the local area, including Shelby Range. For C-130 operations, there is a landing zone and numerous drop zones in the Camp Shelby complex. Low level routes and a Low Altitude Tactical Navigation (LATN) area are also available for training purposes.

The Shelby Ranges are controlled ranges that include a variety of tactical targets with several attack headings with two Threat Emitters, two Smokey Sam Launchers, and a Simulated Laser Target which significantly enhances training realism. Chaff and flares can also be utilized. The West Range Complex, with prior coordination, can be used for live weapons deliveries. Environmental concerns at the Shelby Ranges are primarily associated with expended ordnance and destruction and burial of live expended ordnance.

The AVCRAD facility, operated by the Army National Guard (ARNG), and the Army's Camp Shelby ranges were not investigated during this Preliminary Assessment. Both the AVCRAD facility and the Camp Shelby ranges will be investigated by the U.S. Army/ARNG in the near future.

III. ENVIRONMENTAL SETTING

A. METEOROLOGY

The annual mean temperature for Gulfport, Mississippi, is recorded as 67.9°F with a greatest monthly mean of 82.2°F occurring in July and a minimum monthly mean of 51.6°F occurring in January. Daily high temperatures average in the low 90s for July and August while daily low temperatures reach the low 40s in January. The Gulf of Mexico tends to help moderate the temperature and enhance precipitation patterns of the coastal area around Gulfport.

Annual precipitation amounts for the coastal area average 60 inches per year. The closest National Oceanic and Atmospheric Administration (NOAA) monitoring station is located about 4.5 miles west-southwest of the Training Site at the U.S. Naval Reservation in Gulfport. The annual precipitation recorded at this location is 62.85 inches per year. A NOAA station, located nine miles east of the Training Site in Biloxi, records a value of 61.0 inches per year while another NOAA station, about 20 miles west-northwest of the Training Site, records a value of 65.16 inches per year. The precipitation for the Training Site will be assumed to be 62.5 inches per year. According to the <u>Water Atlas of the United States</u> (1973), Plate 12, the average annual evaporation from open water surfaces is 47.5 inches. Using the method outlined in the <u>Federal Register</u> (47 FR 31224, 16 July 1982), the annual net precipitation for the Training Site is 15 inches. Rainfall intensity based on the 1-year, 24-hour rainfall (47 FR 31235, 16 July 1982, Figure 8) is 5 inches.

B. GEOLOGY

The Training Site is located at the Gulfport-Biloxi Regional Airport in Gulfport, Harrison County, Mississippi, which is approximately two miles from the coast of the Mississippi Sound and Gulf of Mexico. It lies in the Gulf-Atlantic Coastal Flats subdivision of the Atlantic Division physiographic province according to the <u>National Atlas of the United States</u>

of America. The topography around the airport is characterized by gently rolling terrain but with beach ridges between the airfield and the coast.

The Training Site rests on a deposit known as the Pamlico Sand of Pleistocene age that outcrops throughout much of the coastal plain around Gulfport. Below the Pamlico lies the Citronelle that was deposited at the end of the Pliocene and at the beginning of the Pleistocene epochs. Table 1 describes stratigraphic relationships and lithologic and hydrologic properties of geologic deposits beneath the City of Gulfport. Some well logs on and around the Training Site do not record the Citronelle, indicating that it may have "pinched out" beneath the airfield. Another possibility is that drillers may have mistakenly incorporated Citronelle deposits with the underlying Graham Ferry deposits of Pliocene age. Beneath the Graham Ferry formation lies the Pascagoula formation of Miocene age. Three wells are located on GFTS property, the deepest of which reaches 790 feet below land surface. The log for this well is shown in Table 2. It can be seen that the Pascagoula formation is not encountered even at this depth, indicating that the surface of the Pascagoula is at least 800 feet below the surface.

The Pamlico Sand formation is generally composed of gray and tan sand with some clay and silt resulting from periods of lagoonal depositions. A section on the southeast bank of the Wolf River, about eight miles west southwest of the Training Site, exposes a 15 foot thick section of the Pamlico. The upper three feet are composed of sand and weathered chert pebbles grading upward to sandy loam. The next two feet are made up of lenticularly bedded gray clay. The lower ten feet are characterized by yellow clayey sand with pebbles of weathered chert.

The Citronelle deposits beneath the airfield appear to be absent according to some well log information. They may have been reworked, eroded, or redeposited as part of the Pamlico. The lithology of the Citronelle tends to include a larger percentage of coarser sands and gravels than does the Pamlico. The Citronelle is also characterized by its brick-red sand deposits although this is generally more common in northern Harrison County where the Citronelle caps ridge crests.

Table 1

Stratigraphic Relationships and Lithologic and Hydrologic Properties of Geologic Deposits Beneath Gulfport, Mississippi

AGE	DEPOSIT/FORMATION	LITHOLOGIC AND HYDROLOGIC DESCRIPTIONS
PLEISTOCENE	o Pamlico Sand	Up to 75 feet thick. Mostly unconsolidated gray and tan sand; locally contains pebbles of quartz and chert and, in former lagoonal areas, much clay and silt. Contains much water in the beach areas under water-table conditions and in contact with salt water. In many places, the supply has been contaminated with sewage.
PLEISTOCENE	o Citronelle Formation	Up to 160 feet thick. Brick-red sand and gravelly sand: the pebbles are mostly brown chert and milky quartz; generally cross-bedded, and, in the lower part, contain thin beds and pockets of gray clay and clayey gravel. Supplies shallow domestic wells throughout most of the area. A few municipal wells are completed in this aquifer. Quality of water is fair. The water usually contains low dissolved solids and has a low pH.
PLIOCENE	o Graham Ferry Formation	Up to 200 feet thick. Silty clay and shale, sand, silty sand, and gravelly sand and gravel in heterogeneous deltaic masses; various colors, generally dark; carbonaceous clay most abundant in the outcrops; marine fossil casts in the upper beds are common. The most intensively developed formation, containing water under artesian pressure throughout southern part of the area. Some water for industrial purposes has come from Graham Ferry.
PLIOCENE	o Pascagoula Formation	Up to 1000 feet thick. Clay and shale, generally blue-green, silt, sandy shale, gray and green sand, gray silty clay, and dark sandy gravel containing numerous grains and pebbles of polished black chert; of estuarine or deltaic origin. An important source of water supply for municipal, industrial, and domestic wells. Quality of water is good although hydrogen sulfide content may be a local problem. The eastern part, Jackson and eastern Harrison Counties, contains some brackish water, the salt content increasing with depth and toward the east.

Sources: G.F. Brown, et al, 1944, and T.N. Shows, 1970.

Table 2. Well Log for a Well Adjacent to the ANG Training Site at Gulfport-Biloxi Regional Airport, Gulfport, Mississippi

Gulfport Field 1

Harrison County Well No. L85

Altitude: 22.14 feet

	Thickness feet	Depth feet
Pamlico Sand		
Loam, sandy	10	10
Graham Ferry formation		
Gumbo	80	90
Sand	63	153
Shale, blue	25	178
Marl, sandy	88	266
Gumbo	10	276
Shale, sandy	279	555
Sand	104	659
Shale, sandy	19	678
Sand, water-bearing	28	706
Gumbo	84	790

This well is located near the northeastern corner of the Training Site and was drilled in 1942 for the U.S. Army along with four other wells within 0.5 mile distance of each other. Some of these wells are now abandoned and are owned by the city of Gulfport.

This well log was taken from the Mississippi State Geological Survey Bulletin 60 by G.F. Brown et al, 1944.

The Graham Ferry formation is of deltaic origin and is thickest beneath Gulfport. The sediments were laid down as predominantly continental and brackish water deposits although some marine fossils can be found. Layers of silty clay and shale, sand, silty sand, and gravelly sand are included in the section. Most exposures of clay, shale, and argillaceous sand contain carbonaceous plant fragments sometimes associated with casts of mollusks.

The soils on the airfield and Training Site fall into four soil series: Ocilla loamy sand (Oc), Poarch fine sandy loam (PoA, PoB), Sulfaquepts (Sw) and Plummer loamy sand (Pm). There are no buildings on the Plummer soil. This soil is confined to the flats bordering the unnamed stream that runs northward parallel to the east boundary of the FTS. Because this soil type is not associated with any of the potential sites, it will not be discussed any further. The Poarch soils are further divided into three slope divisions, two of which are found on the Training Site: PoA indicates slopes of 0- to 2-percent while PoB indicates slopes of 2- to 5-percent. The following soil descriptions are taken from the Soil Survey of Harrison County, Mississippi (1975) issued by the Soil Conservation Service and Forest Service of the U.S. Department of Agriculture. The locations of these soils can be seen in Figure 5, Soils Map of Air National Guard Training Site, Gulfport, Mississippi. Sulfaquepts and Poarch fine sandy loam underlie the JP-4 fuel facility on Mill Road which is not shown in Figure 5. With the exception of Sulfaquepts, more than half the acreage for these soils is pine woodland. The rest is used for urban purposes or pasture or is idle.

- Ocilla Series

  Ocilla loamy sand (Oc). - This is a somewhat poorly drained soil on broad flats. Slopes are 0 to 2 percent. Included in this series are small areas of Atmore, Harleston, and Plummer soils.

  In a representative profile, the surface layer is black, loamy sand about 5 inches thick. The next layer, about 16 inches thick, is loamy

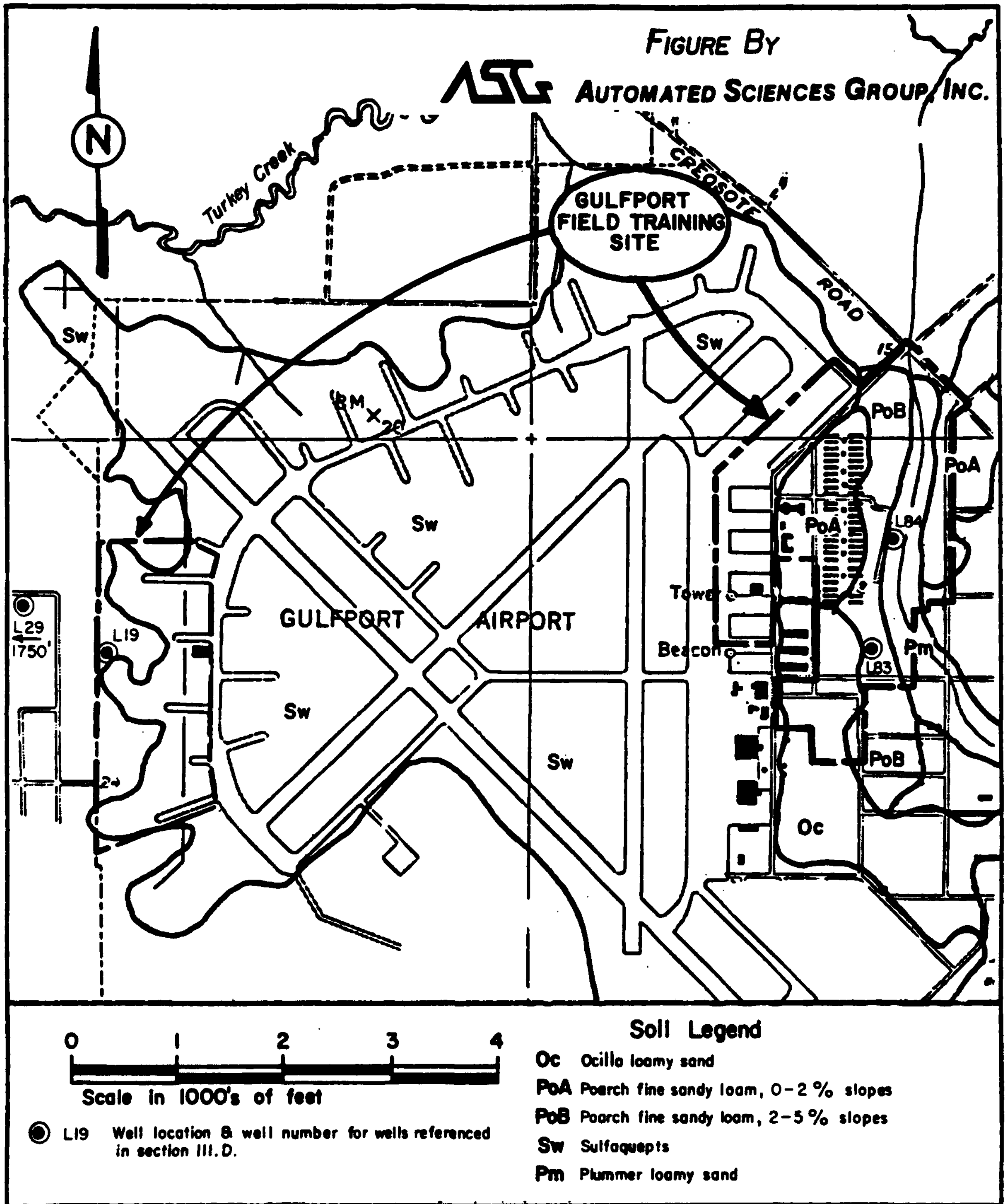


Figure 5. Soils Map of Air National Guard Field Training Site at Gulfport-Biloxi Regional Airport, Gulfport, Mississippi.

Source: U.S.G.S. Base Map for Gulfport North Quadrangle, (1954).

sand that is dark gray in the upper part and mottled with shades of brown in the lower part. The subsoil, to a depth of 67 inches, is sandy loam mottled with shades of brown, gray, and red.

This soil is strongly acid or very strongly acid. Permeability is moderate, and available water capacity is low to medium. Runoff is slow.

Pasture plants, ornamental shrubs, lawn grasses, and pine trees are suited. Soil blowing is a hazard on bare and unprotected soil during dry periods. Water is a hazard during wet periods. A water disposal system is needed to reduce soil erosion especially in the bottom lands.

o Poarch Series

In a representative profile the surface layer is very dark grayish-brown, fine sandy loam about 5 inches thick. The upper part of the subsoil, to a depth of 52 inches, is yellowish-brown, fine sandy loam that has strong-brown mottles in the lower part. The middle part, to a depth of 59 inches, is fine sandy loam mottled with shades of brown, red, and gray. The lower part of the subsoil, to a depth of 84 inches, is brittle and compact fine sandy loam or sandy clay loam that is mottled with shades of brown, gray, and red or has a matrix color of strong brown.

Poarch fine sandy loam, 0 to 2 percent slopes (PoA). - This is a well-drained soil on broad upland flats. It has the profile described as representative of the series. Included in this series are small areas of Harleston and Smithdale soils.

This soil is strongly acid or very strongly acid. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. The available water capacity is medium. Runoff is slow.

Corn, soybeans, truck crops, pasture plants, and pine trees are suited.

Poarch fine sandy loam, 2 to 5 percent slopes (PoB). - This is a well-drained soil on ridges. Included in this series are small areas of Harleston, Latonia, Saucier, and Smithdale soils. Also included are small areas of soils similar to Poarch soils, but the surface layer is loamy fine sand.

The surface layer is very dark grayish-brown, fine sandy loam about 4 inches thick. The subsoil extends to a depth of 84 inches. The upper 5 inches is dark grayish-brown, fine sandy loam, and the next 47 inches is yellowish-brown sandy loam. Below this is a brittle and compact sandy clay loam layer mottled with shades of brown, red, and gray.

This soil is strongly acid or very strongly acid. Permeability is moderate in the upper part and moderately slow in the lower part. Available water capacity is medium. Runoff is slow to medium.

Corn, soybeans, truck crops, pasture plants, and pine trees are suited to this series. If the soil is left bare and unprotected, there is a slight hazard of erosion.

o Sulfaquepts (Sw)

The Sulfaquepts mapping unit is made up of soils that formed in areas of hydraulic fill. They are along the marshes, beaches, and the Harrison County Industrial Waterway.

A representative profile from the top shows about 6 inches of pale-brown sand that is stratified with brownish and yellowish sands and that contains common, coarse, very dark gray clay balls which have thin coats of sulfur; 7 inches of gray sand that is stratified with yellowish sands and that contains common, coarse, very dark gray clay balls which have thin coats of sulfur; 20 inches of stratified gray sand that contains few medium clay balls, and below this, to a depth of 50 inches, stratified gray sand.

These soils were accumulated by diking, then filling the dikes with sand, silt, and mud by pumping and using brackish water or sea water. The materials in these areas, although dominantly sands, are variable in texture, ranging from sand to silty clay and clay. The surface layer is extremely acid, but reaction is variable in the subsoil. These soils contain sulfur. A few months after an area has been filled, patches of yellow elemental sulfur appear on the surface. The available water capacity generally is low.

Included in this mapping unit are small areas of fill that are used for building sites and lawns. After the soil material is dry, it is leveled and used for industrial and residential sites.

These soils are capable of growing only a few plants. In their present state, they are unsuited to lawns. Where a lawn is to be developed, the management required is so severe and plant adaption so limited that the solution in most cases is to add oyster shells or limestone and then plate the area with suitable topsoil material.

Several subsurface soil investigations have been performed at the Training Site as new phases of facility construction have occurred. One of these investigations was performed for a repair project on the dormitory roads at the Training Site. This investigation revealed the following general soil profile:

- Ignoring the surface asphalt and gravel base of the dorm roads, one to two feet of firm fine silty sand (SM)*,

- Two feet of loose to firm fine silty and (SM) and two more feet of firm fine clayey sand and silty sand (SC to SM).

Some of the information from this investigation is given in Appendix F.

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*Unified Soil Classification System (U.S.C.S) symbol. See bibliography reference no. 11, Holtz and Kovac.

C. HYDROLOGY

A discussion of the hydrology at the Training Site is necessary in order to provide a framework for the possible pathways along which contaminants could travel. This subject is divided into two parts, surface water and ground water. This information is intended to be an aid in conceptualizing a pathways model to be used in the determination of possible waste migration.

Another purpose for considering the Training Site hydrology is to assist in the determination of the possible reception of any contamination that could migrate along existing pathways.

1. Surface Water

Flood data for the Base were taken from the Floodway: Flood Boundary and Floodway Map, City of Gulfport, Mississippi (1988). This map can be obtained from the National Flood Insurance Program and indicates that the Training Site does not lie in a floodplain associated with a 100-year flood. One of the potential sites, Site No. 2 (JP-4 Fuel Storage Facility on Mill Road), is offbase and is located in a floodplain associated with a 100-year flood.

The Gulf Coastal area of Mississippi around Gulfport is drained principally by the Biloxi River. One tributary, Bayou Bernard, travels eastward and passes within a mile of the north boundary of the Training Site. A small tributary of Bayou Bernard, Turkey Creek, joins with Bayou Bernard just north of the airfield. A stream and levee system, Bayou Brickyard, passes south of the airfield and joins Bayou Bernard about 1 mile east of the Training Site just south of the off-base POL facility. These drainage features can be seen on Figure 3, Gulfport ANG Field Training Site and Immediate Surrounding Area.

There is an unnamed stream or drainage ditch between the dormitories and the eastern boundary of the Training Site which travels north and empties into Bayou Bernard. Figure 6 shows the basic drainage patterns at the Training Site itself.

2. Ground Water

The aquifers of interest in the Gulfport area correlate with the formations mentioned in the geology portion of this report. There are several aquifers in the gulf coastal area including the Catahoula, Hattiesburg, Pascagoula, Graham Ferry, and Citronelle. Most of these consist of thick beds of sand or gravel separated by clay layers. The sands are usually lenticular so they are not continuous over large areas; however, most of these aquifers are capable of supplying large volumes of water.

The fresh water aquifers in Harrison County can be found at depths of up to 2500 feet near Gulfport. Most major supply wells in Gulfport tap two aquifers at 900 and 1200 feet below the surface. These are the Graham Ferry and Pascagoula aquifers, respectively. Fresh water intervals in these sand aquifers range in thickness from 10 to 270 feet with a medium thickness of 65 feet.

Aquifers at depths of more than 500 feet along the gulf coast often have sufficient artesian pressure to support flowing wells. This occurrence has decreased in areas where ground-water withdrawal has reduced the pressure head of the tapped aquifers.

The recharge areas for these aquifers range from along the coastal belt for the Pamlico Sand to Stone County for the 1200-foot sand of the Pascagoula formation. Recharge occurs by infiltration of precipitation for the most part and, to a lesser degree, through overlying sandy deposits as well as seepage between aquifers that have a sufficient head differential.

Ground-water levels in the coastal region around Gulfport declined an average of one foot per year from 1939 to 1966. In Gulfport, this decline

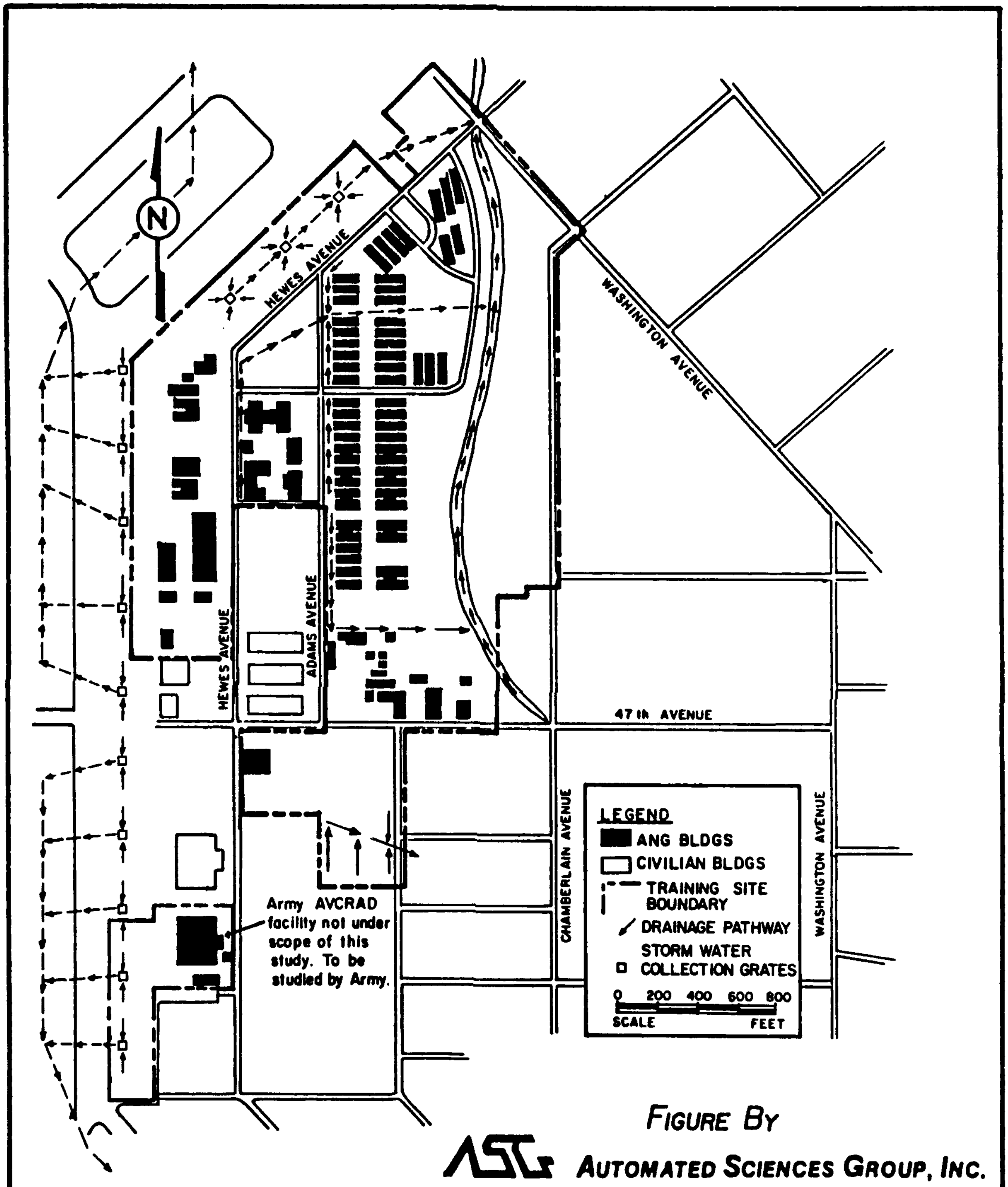

Figure 6. Major Drainage Pathways at the Air National Guard Field Training Site at Gulfport-Biloxi Regional Airport, Gulfport, Mississippi (1988).

Note: Drainage pathways are dashed where covered.

has reduced the pressure head in the 1200-foot sand of the Pascagoula formation from a prepumping head of 65 feet above the surface in 1911 to a head of one foot below the land surface in 1965. Records for Pass Christian, Gulfport, and Biloxi show that the water levels around Gulfport are the lowest of the three. This indicates that the general ground-water flow, which is towards the Gulf, also curves somewhat towards Gulfport, thus creating a sink for the ground water. In the vicinity of the airport, the flow of the ground water in the Pamlico Sand near the surface probably moves towards the nearest open water channel such as Bayou Bernard, Turkey Creek, and Bayou Brickyard. The depth to the water table on the Training Site has been found to be 2.5-to 5-feet from the surface. The topography on the Training Site is relatively flat. The eastern edge of the Training Site slopes down towards the east into the drainage ditch. Because of the low topographic slopes, the ground-water flow of the water-table aquifer is controlled mostly by the presence of the nearby streams that act as sinks or receptors for the shallow ground water.

D. BACKGROUND LEVELS

This section provides some information on common constituents or properties encountered in the soil, surface water, and ground water around the Training Site. This information was obtained primarily from the Soil Survey of Harrison County, Mississippi (1975), Water for the Growing Needs of Harrison County, Mississippi, Geological Survey Water-Supply Paper 1856 (1968), and the Water Resources of Mississippi, Mississippi Bureau of Geology Bulletin 113 (1970). Table 3 provides some physical and chemical properties of the soils encountered on and around the Training Site while Table 4 presents chemical analyses data from nearby wells.

E. CRITICAL ENVIRONMENTS/THREATENED AND ENDANGERED SPECIES

There are no areas designated as critical habitats or wilderness areas, nor endangered or threatened species of flora or fauna in the vicinity of the Training Site. There are five plant species considered rare in Mississippi

Table 3. Some Physical and Chemical Properties of Soils Encountered on and around GFTS at Gulfport-Biloxi Regional Airport, Gulfport, Mississippi.

SCS[1] soil name (and mapping unit)	Depth (in.)	Permeability (in./hr)	Available water capacity[2] (in./in.)	Soil reaction (pH)
Ocilla (Oc)	0-21	2.0 - 6.3	0.06-0.10	4.5-5.5
	21-67	0.63- 2.0	0.10-0.14	4.5-5.5
Poarch (PoA and PoB)	0-59	0.63- 2.0	0.09-0.15	4.5-5.5
	59-73	0.20- 0.63	0.10-0.15	4.5-5.5
	73-84	0.20- 0.63	0.07-0.10	4.5-5.5
Sulfaquepts (Sw)	0-13	6.3 -20.0	0.02-0.06	4.0-6.0
	13-50	6.3 -20.0	0.02-0.06	7.9-9.0

Source for this table: Table 6 of Soil Survey of Harrison County, Mississippi (1975), pp. 48-49.

1 SCS - Soil Conservation Service

2 Defined by SCS as the capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point and is expressed as inches of water per inches of soil.

Table 4. Chemical Analyses of Wells Near the Training Site (Parts Per Million except as indicated otherwise).

	Well No. (See Figure 5 for locations)			
Parameter	L29	L19	L83	L84
DATE OF COLLECTION	12-16-65	8-13-64	6-14-51	6-14-51
Depth of well (feet)	35	229	668	645
Use of well[1]	Unk	D	U	P
Aquifer screened	Citronelle	Graham Ferry	Graham Ferry	Graham Ferry
Silica (SiO_2)	—	29	41	42
Total iron (Fe)	—	.38	.16	.30
Calcium (Ca)	—	1.6	.9	.4
Magnesium (Mg)	—	0	.5	.5
Sodium (Na)	—	69	53	51
Potassium (K)	—	.2	2.4	3.0
Bicarbonate (HCO_3)	134	173	125	120
Carbonate (CO_3)	7	0	0	0
Sulfate (SO_4)	11	7.8	9.1	10
Chloride (Cl)	2.0	3.8	5.2	7.2
Fluoride (F)	—	.3	0	0
Nitrate (NO_3)	—	.1	.7	2.4
DSR[2]	—	197	174	171
Hardness (Ca, $MgCaCO_3$)	—	4	4	3
SEC[3] (umhos/cm @ 25°C)	—	290	219	214
pH	—	7.3	7.9	7.9
Color	—	15	6	5
Temperature (°F)	78	72	78	78

Source for this Table: Newcombe, et al, 1968.

[1] Unk - unknown, D - domestic, P - public, U - unused

[2] DSR - Dissolved Solids Residue after evaporation at 180°C

[3] SEC - Specific Electrical Conductance

that have been collected in the vicinity of the Training Site and are monitored by the Mississippi Natural Heritage Program (MNHP). However, none of these species are protected by state or federal law. Lastly, there are no major wetlands within a one mile radius of the main portion of the GFTS. However, there are major wetlands within a one mile radius of the POL facility and the Fire Training Area. These wetlands are shown as swampy areas on Figure 3.

IV. SITE EVALUATION

A. ACTIVITY REVIEW

A review of the Training Site records and interviews with past and present Training Site employees resulted in the identification of specific operations within each activity in which the majority of industrial chemicals are handled and wastes are generated. Table 5 summarizes the major operations associated with each activity, provides estimates of the quantities of waste currently being generated by these operations, and describes the past and present disposal methods for these wastes. Records were not available to describe past waste disposal methods in the 1950s to 1980s. Listed methods of disposal for this time period are a best-estimate based on interviewee information. If an operation is not listed in Table 5, then that operation has been determined on a best-estimate basis to produce negligible quantities of wastes ultimately requiring disposal.

B. DISPOSAL/SPILL SITE IDENTIFICATION, EVALUATION, AND HAZARD ASSESSMENT

Interviews with 20 past and present Training Site personnel who have an average of 20 years tenure at the Base and a Gulfport city employee and subsequent site inspections resulted in the identification of three potential hazardous materials/waste disposal/spill sites. All sites were scored using HARM (Appendix C). Figures 7 through 9 illustrate the locations of the potential sites. Copies of the completed Hazard Assessment Rating Forms are found in Appendix D. Also included in Appendix D is a summary and explanation of the factor rating criteria used to score the sites. Table 6 summarizes the Hazard Assessment Score (HAS) for each of the scored sites.

The migration pathway of primary concern is the ground-water route, where potential human receptors are owners of residential wells near the Training

Table 5. Hazardous Waste Disposal Summary: Gulfport Air National Guard Training Site, Gulfport Biloxi Regional Airport, Gulfport, Mississippi

SHOP NAME	LOCATION (Bldg No.)	WASTE MATERIAL	WASTE QUANTITY Gal/Yr	METHODS OF TREATMENT, STORAGE, AND DISPOSAL 1954 1970 1980 1988
Aerospace Ground	130	Hydraulic Oil	55	(1970–1988)
Equipment Maintenance	120	Turbine Oil	110	(1970–1988)
(AGE) and Civil	144	Steam/Turbine Oil	15	(1970–1988) DRMO
Engineering		Motor Oil	40	(1970–1988)
Vehicle Maintenance	67	Motor Oil	700	FTA (1954–1980) / Contr (1980–1988)
(Motor Pool)	133	Battery Acid	12	Grnd (1954–1970) / Neutr (1970–1988)
		PD-680	55	Strm Sew (1954–1980) / Contr (1980–1988)
		Developer	6	San Sewer (1954–1988)
		Antifreeze	200	Strm Sew (1954–1970) / San Sewer (1970–1988)
		Hydraulic Fluid	60	FTA (1954–1970) / (1970–1988)
		Lube Oil	30	FTA (1954–1970) / DRMO (1970–1988)
		Engine Oil	15	FTA (1954–1970) / (1970–1988)
		Solvents/Paint Removers	40	FTA/Strm Sew (1954–1970) / (1970–1988)
		Cleaning Compound	220	Strm Sew (1954–1970) / (1970–1988)
Fuel Maintenance (Liquid Fuels)	1*	JP-4	8100**	FTA (1954–1988)
Aircraft Servicing and Minor Maintenance		JP-4 (off-spec.)	included with Fuel Maintenance	FTA (1954–1988)
		used oil		DRMO (1954–1988)

KEY: Strm Sew - Drained to Storm Sewer
San Sewer - Drained to Sanitary Sewer
Neutr - Neutralized and Drained to Storm Sewer
FTA - Fire Training Activities
DRMO - Disposed of by Defense Reutilization and Marketing Office
Contr - Disposed of by Contractor
Grnd - Disposed of on Ground

* Building 1 is a warehouse on the Flightline.

** This quantity estimated to be 30% of the waste fuel that is applied to the pit and is not consumed before the fire is extinguished.

Table 6. Site Hazard Assessment Scores (as derived from HARM): Gulfport Air National Guard Field Training Site, Gulfport-Biloxi Regional Airport, Gulfport, Mississippi

Site No.	Site Description	Receptor	Waste Characteristics	Pathway	Waste Mgmt. Practices	Overall Score
1	Fire Training Area	63	90	80	0.95	74
2	POL Facility	73	54	80	0.95	66
3	Above-ground Storage Tank	68	72	80	0.95	70

Site. The nearest of these wells is approximately 1000 feet southeast of the Training Site. Although there are many privately owned wells in the vicinity of the Training Site, these wells are used for watering of lawns for the most part. Public water is supplied throughout the area and is reported to be used by the entire population as drinking water. To avoid the cost of watering lawns with treated city supplied water, many people use well water instead.

Site No. 1: Fire Training Area (HAS-74)

The MSANG at Gulfport has conducted their fire fighting exercises in an area west of Runway 13-31 and near Taxiway I on land that is leased by the GFTS. This Site has been used solely by the GFTS from approximately 1972 to June 1988, and its location is shown in Figure 7. The training area is a flat, unlined, open, earthen area, slightly bermed, with a general depth of 12 to 18 inches to contain the flammable materials used during training.

Interview information revealed that spent solvents, waste oils, paint "slop" (excess paint and thinner from painting and cleanup), and other flammables in addition to JP-4 fuel were burned in this area. If no water is present in the burn area at the time of an exercise, a water base is applied prior to the burn.

Training is generally done once or twice a month with two to four burns per exercise. On the basis of 18 fire training days every year, using 500 gallons of flammable liquids per exercise, three times a day, it is estimated that 27,000 gallons per year were used. Assuming that up to 70%* of the flammables released at the FTA were destroyed, an estimated 8100 gallons per year may have remained as waste to either evaporate or to infiltrate into the ground. A potential total of 130,000 gallons of waste may have either evaporated or infiltrated into the ground during the 16-year period this FTA has known to be in use. The exact age of the FTA is unknown

*The 70% value is an often used average when specific climatic data is not available.

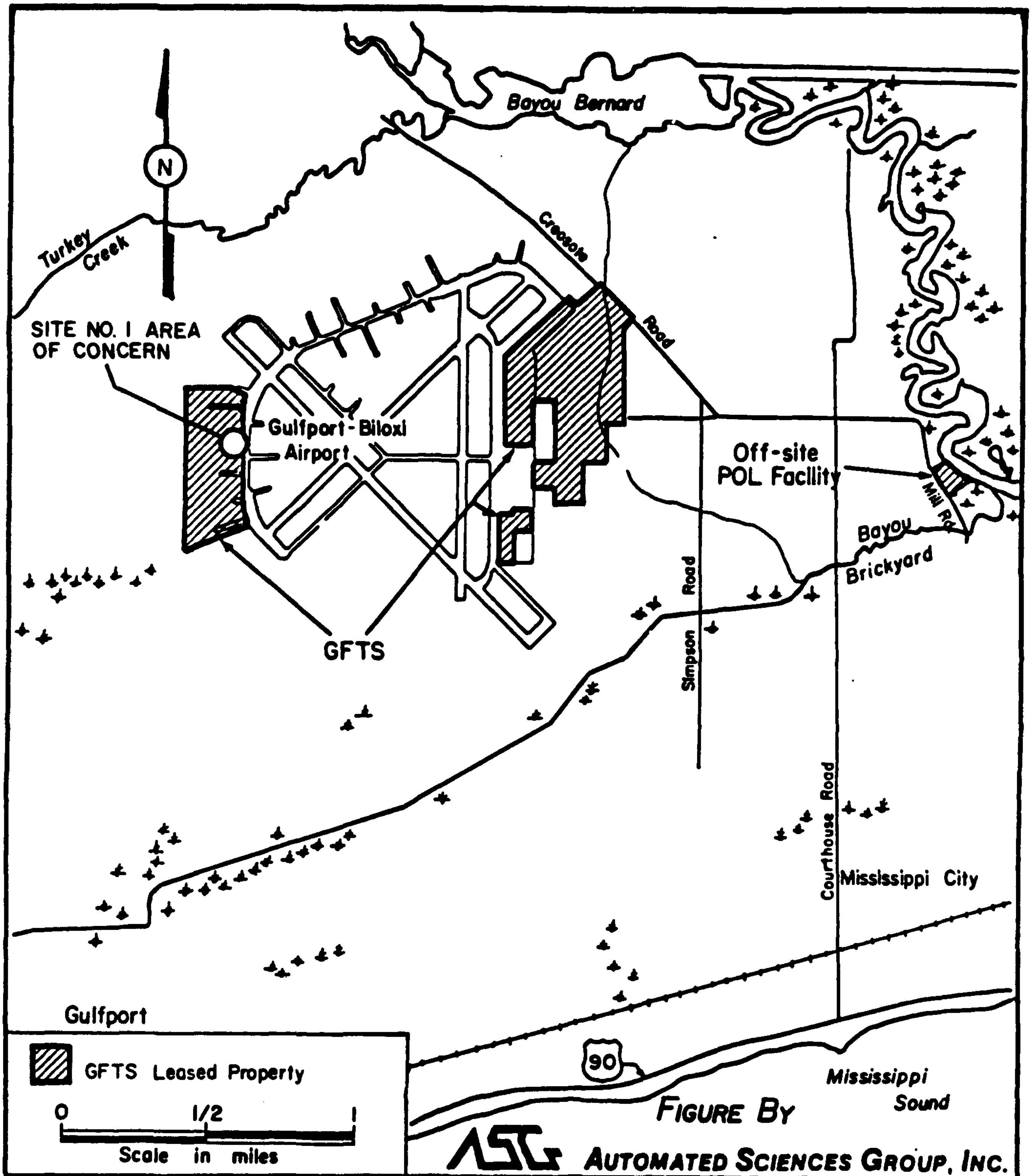

Figure 7. Location Map for Site No. 1, Fire Training Area (1988).

but was probably in use prior to 1972, and it is assumed that it has been in use since the GFTS opened in 1954. This assumption is made because several interviewees were certain that fire training has been conducted at the GFTS since 1954, and there was no knowledge of any other site having been used in the past. Definite knowledge of site use prior to 1972 was not demonstrated by any interviewee.

A small stream that flows within 25 feet of the FTA and drains into a marsh area to the west may serve as a point of discharge for potentially contaminated ground water. Due to the potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to this Site.

Site No. 2: JP-4 Bulk Storage, Mill Road (HAS-66)

Flightline operations at the Training Site are supplied by a POL facility that is approximately one mile east of the main area of the Training Site. This facility is located on Mill Road near Bayou Bernard and is shown in Figure 8. Presently, one above-ground tank, constructed in 1973 with a capacity of approximately 440,000 gallons, is used to supply the JP-4 fuel to the flightline. The JP-4 fuel is delivered to the flightline in 5000 gallon refueling units that make over 1000 trips per year to meet the fuel requirements of the flightline. There have been less than ten accidents with these refuelers since the Training Site started to use this facility in 1954. None of the refuelers have ever tipped over during these accidents. Fuel spills have been minor.

During World War II, two above-ground storage tank were built at the fuel facility. These were used to supply 115/145 aviation gasoline (AVGAS) to the flightlines at the Gulfport Base and to Keesler Air Force Base (AFB). Each of these tanks had an approximate capacity of 25,000 gallons. These fuel tanks were in use from 1943 until 1970 when the use of AVGAS at the FTS was discontinued. These tanks were removed in 1973 and 1974 with the structural steel being hauled offsite. The tank bottom sludges from the demolished tanks were buried within the bermed areas with the bermed areas

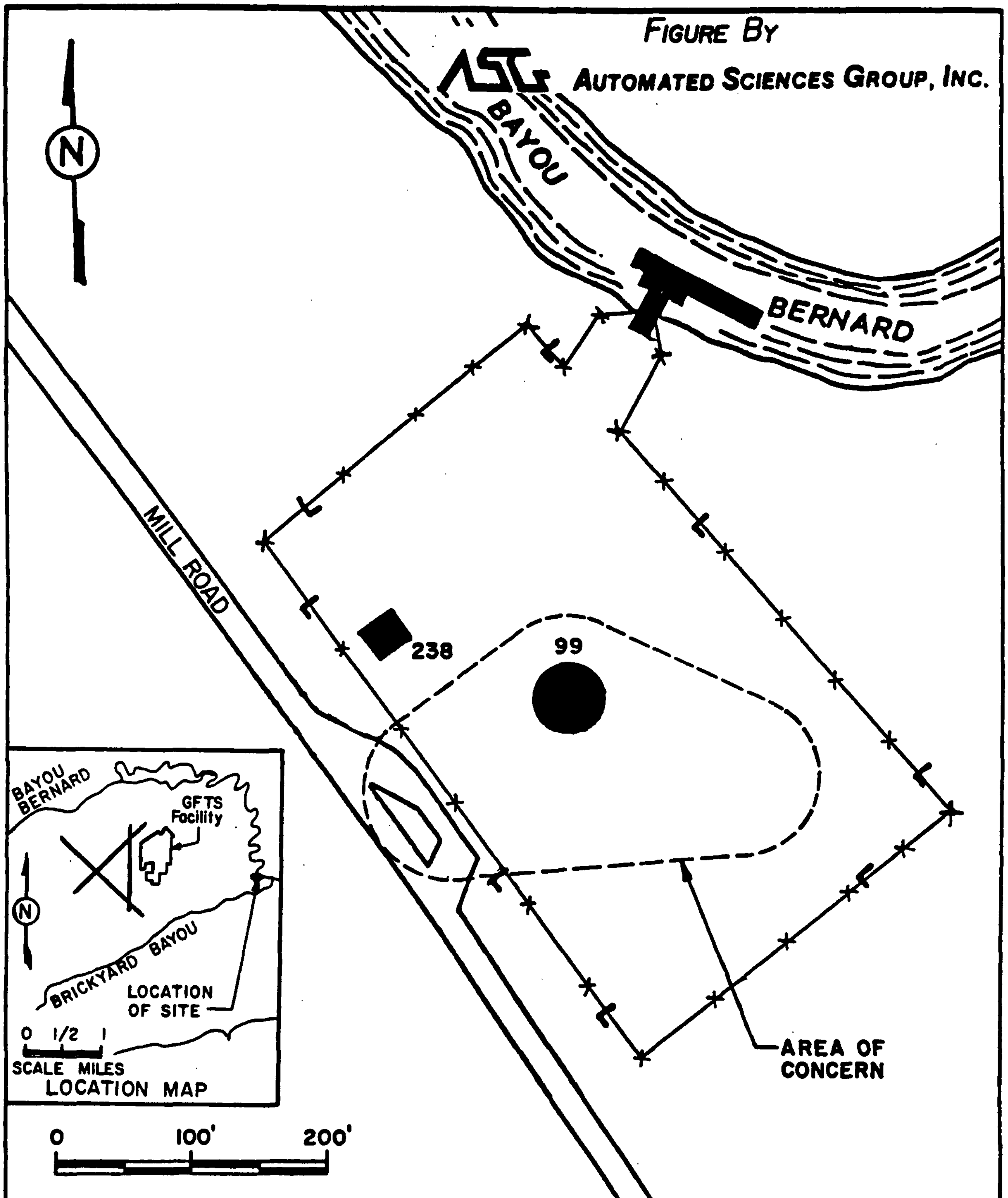

Figure 8. Location Map for Site No. 2, Old POL Facility on Mill Road.

Source: Gulfport-Biloxi Regional Airport, GFTS Base Map (Tab C), (1964).

subsequently being regraded. The area to the northwest of the present JP-4 tank is privately owned while the area where the southeast tank was located is on land presently leased by the GFTS. In 1973, a 440,000 gallon above-ground JP-4 fuel storage tank was constructed on the Site to supply the jet fuel necessary for the GFTS flightline operations. This tank is still being used.

Potential for environmental contamination resulting from each stage of usage (AVGAS and JP-4 Storage) is the result of two related activities: routine discarding of condensed moisture (fuel-contaminated water) drained from the tanks and removal of fuel sludge from the storage tanks during periodic tank cleaning activities. In both cases, wastes were discarded within the bermed areas of the tanks.

Condensed moisture from all of these tanks was drained daily. The condensation was typically discarded directly into the soil in the immediate vicinity of the base of tanks. An estimated one-half to one gallon of condensed moisture was discarded daily from each tank. At the maximum rate of release, an estimated 19,700 gallons of water contaminated with AVGAS may have possibly been released within the bermed areas of the AVGAS storage tanks over the 27-year time period (1943-1970) that AVGAS was used by the GFTS. An estimated 5500 gallons of water contaminated with JP-4 fuel may also have been released within the bermed area of the present JP-4 fuel storage tank during the 15 years (1973-1988) that this tank has been in use. If it is assumed that the condensed moisture was 98 percent water, an estimated 400 gallons of AVGAS and 110 gallons of JP-4 fuel may have infiltrated into the soil at this Site.

Additionally, a fuel spill of aviation gasoline occurred in the mid-60s during a fuel transfer operation near the refueling island. A fill spigot was wired open prior to fuel dispensing. The spigot was not in the fill neck when the dispensing pump was turned on. An estimated 2000 gallons of aviation gasoline was spilled. The spill was water flushed to the storm drainage system with an estimated 95% of this spill either evaporating or being flushed to the storm drainage system.

The tanks were periodically cleaned to remove any sludge that may have built up on the bottoms of these three tanks. The sludge from the tank cleaning operations was typically spread on the ground for the evaporation of the volatile components. The residues were disposed of through shallow land burial within the bermed areas of the containment system

On the day that this Site was assessed, there were visible oily spots in the grassy area adjacent to the base of the fuel (JP-4) tank. Also, there was floating POL products on the standing water contained within the bermed containment area.

Due to the potential threats to the local surface water and ground water by the possible contaminant releases at this POL fuel storage area, a HAS was applied to this Site. A relatively shallow water table was the contributing factor to the ground-water susceptibility. Local surface water and recreational coastal inlets could also potentially be affected if contamination is present at this Site. Bayou Bernard is estimated to be within 200 feet of this facility.

Site No. 3: Motor Pool Above-Ground Diesel Storage Tank (HAS-70)

A 5000 gallon above-ground diesel fuel storage tank (Facility No. 200) located to the east of Building 68 is used to supply the motor pool. The tank has been in place since 1954 and is shown in Figure 9. The tank was used for MOGAS storage until 1981 when it was converted to diesel fuel storage. Interview information indicated that this tank is refilled 18 to 24 times per year. The diesel fuel from this tank is then dispensed in bulk quantities of from 600 to 1200 gallons to support GANGTS activities.

A precise determination of the total quantity of contaminants released could not be determined during the records search. If it is assumed that the diesel fuel is dispensed in 600 gallon aliquots, then 200 refueling operations could occur under maximum fuel usage in one year. If one-half gallon of fuel is spilled during each transfer operation, then an estimated

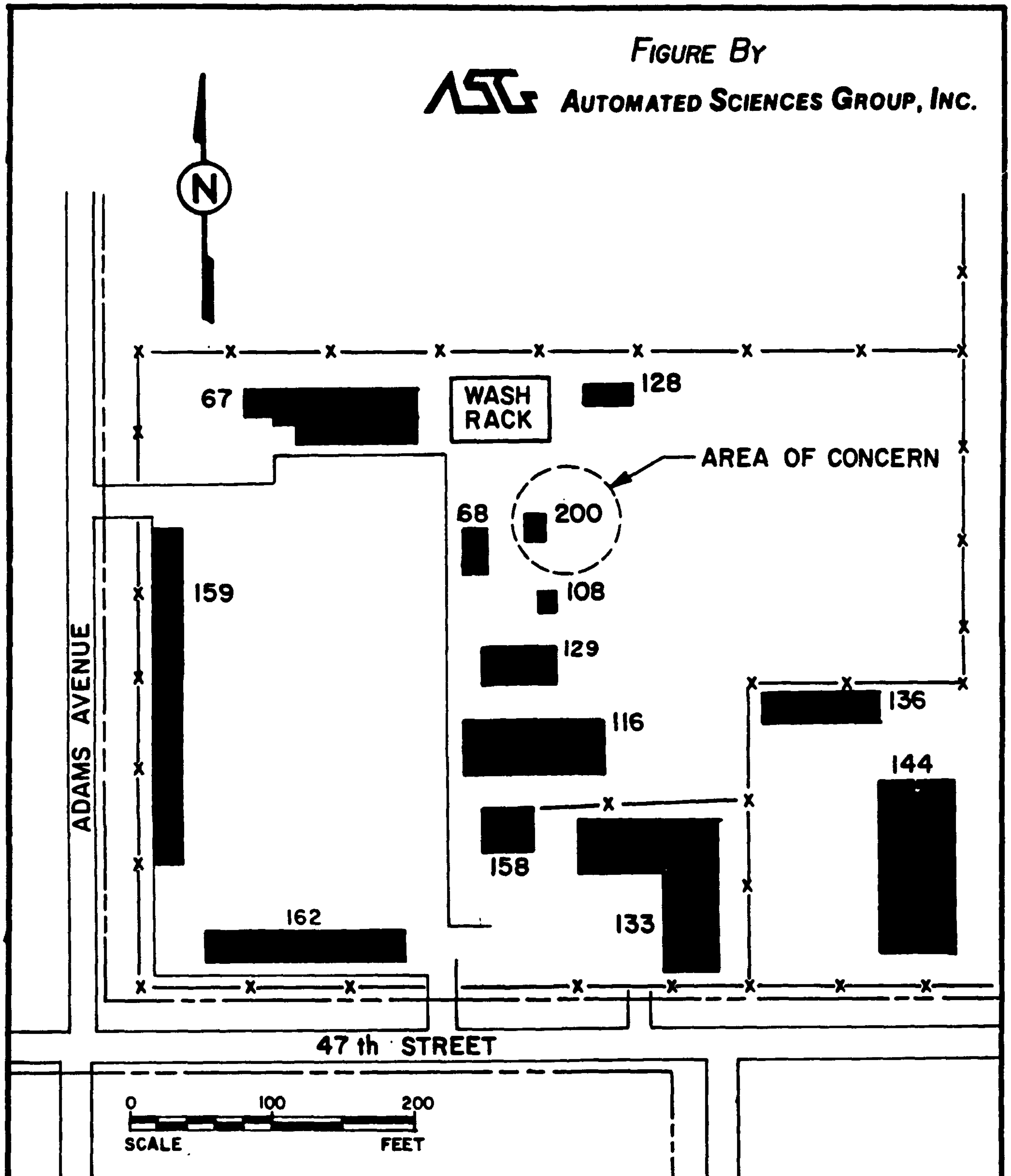

Figure 9. Location Map for Site No. 3, 5000 Gallon Above-ground Diesel Fuel Storage Tank (1988).

3400 gallons of fuel (2700 gallons of MOGAS and 700 gallons of diesel fuel) may have been released at this Site since 1954.

There was visible soil staining present within and near the bermed containment area indicating that many minor fuel spills have occurred since 1954 during fuel transfer operations at this Site. Therefore, this Site may pose a potential threat to the local surface- and ground-water pathways. A HAS rating was applied to this Site.

C. OTHER PERTINENT INFORMATION

- A 2000 gallon above-ground storage tank was installed as an underground diesel fuel tank in an area east of Building 131. The tank was installed in 1976, filled once, was noted to be "leaking" (ground water entering the tank), was subsequently emptied and refilled with water. There was minimal opportunity for ground-water contamination to occur, insofar as the ground water seemed to have entered the tank, rather than diesel fuel having leaked from the tank.

- Gulfport FTS Hazardous Substance Storage Area at Bldg. 2: Used waste products were stored in this area but there was no evidence of leakage or spills in this area.

- Gulfport FTS Electrical Transformer Storage Area at Bldg. 2: Transformers at GFTS that are removed from service are routinely tested for PCBs before they are sent to Keesler AFB for final disposal. Most of the out-of-service transformers have had levels of PCBs in excess of 50 ppm and thus could pose a threat to the environment if they should leak. There have never been any known leaks of PCB oils at the GFTS.

- Sanitary sewage is connected to publicly-owned treatment works.

- There are no landfills, nor have there ever been, or radioactive burial sites, or sludge burial sites on the main area of the GFTS. However, fuel tank sludge was deposited at the POL tank farm on Mill Road.

- There are two inactive and one active well on the GFTS. The active well, located southeast of Building 96, is used by the city of Gulfport for the public water system. All wells draw from a depth of approximately 500 feet or greater.

- There has not been extensive use or storage of pesticides on the Base.

- There are five Underground Storage Tanks on the GFTS property for which the ANG is responsible (Appendix E). Only one of these tanks is known to have leaked.

- All Oil/Water separators (OWS) appear to be functioning correctly. The oil-free fraction of the OWS at Building 133 (motor pool) discharges to the sanitary sewer system. The other two OWS (Buildings 67 and the quonset hut) discharge to storm drainage.

V. CONCLUSIONS

- Information obtained through interviews with 20 Training Site personnel and one city of Gulfport employee, review of records, and field observations has resulted in the identification of three potentially contaminated disposal/spill sites on the Training Site proper and nearby leased property. There is a potential for contaminant migration at all of the sites.

- As of the date of report, there are five Underground Storage Tanks on the GFTS property for which the ANG is responsible. These include an abandoned 2000 gallon diesel fuel tank at Building 131, two 10,000 gallon MOGAS tanks east of Building 68, and one 500 gallon waste oil holding tank each at Buildings 68 and 133. There is no evidence that any of these tanks have leaked, but water is known to have leaked into the Building 131 diesel fuel tank immediately after installation. This tank was emptied of fuel, refilled with water, and not reused. (Appendix E). None are considered to be contaminated sites.

- The overall ground-water and geologic environment makes underlying aquifers susceptible to contamination from surface sources. Geologic characteristics at the Training Site contributing to this susceptibility include the presence of moderately permeable soil and a shallow ground-water table. The water table is generally within 10 feet of the surface.

- All drinking water at the Training Site is supplied by the City of Gulfport. The City also accepts all sewage from the Training Site.

- There are no private drinking wells within a 3 mile radius of the Training Site. There are private wells that are used for irrigation purposes within a 3 mile radius of the Training Site. A few of these wells tap the uppermost aquifer, the Pamlico Sand, although most tap the Citronelle or the Graham Ferry Aquifers.

- The City of Gulfport has three water wells that are located just outside the GFTS fence but still on property leased by the ANG. These wells are north of Building 153, east of Building 45, and southeast of Building 96. These wells are between 500 and 790 feet deep. There is no evidence of well contamination, nor is there a potential source of contamination of type and magnitude sufficient to constitute a credible threat to these wells. Two of these wells are no longer used. The well located about 200 feet southeast of Building 96 is listed as a public supply well by the U.S.G.S. and is connected to the City public drinking water system.

Note: All ground-water flow referenced in this report is assumed from regional flow, topographic, and geologic information. Actual site specific flow beneath the GFTS is not yet known.

VI. RECOMMENDATIONS

Based on the investigation documented in this PA and the HARM scores the three identified sites received, it is recommended that further IRP action be implemented.

GLOSSARY OF TERMS

AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct ground water and to yield economically significant quantities of ground water to wells and springs.

ARGILLACEOUS - Partly composed of clay minerals or clay-size particles.

ARTESIAN - Usually referring to ground water confined under hydrostatic pressure.

BRACKISH - An aquatic environment where the salinity of the water is intermediate between that of normal seawater and that of normal fresh water.

CARBONACEOUS - Said of a rock or sediment that is rich in carbon.

CLASTIC - Pertaining to rock or sediments primarily composed of broken fragments derived from pre-existing rocks or minerals which have been transported a considerable distance from their place of origin.

CONTAMINANT - As defined by Section 101(f)(33) of SARA shall include, but not be limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under the following,

(a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

(b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

(c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),

(d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

(e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

(f) any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquified natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CRETACEOUS - Of or relating to the period of geologic time that occurred after the Jurassic Period, generally thought to be about 130 million years ago.

CRITICAL HABITAT - The native environment of an animal or plant which, due to either the uniqueness of the organism or the sensitivity of the environment, is susceptible to adverse reactions in response to environmental changes such as may be induced by chemical contaminants.

DELTAIC DEPOSIT - A sedimentary deposit laid down in a delta, characterized by well-developed local cross-bedding and by a mixture of sand, clay, and the remains of brackish-water organisms and of organic matter.

DISCHARGE - The release of any waste stream, or any constituent thereof, to the environment which is not recovered.

DOWNGRADIENT - A direction that is topographically or hydraulically down slope; the direction in which ground water flows.

EMBAYMENT - The formation of a bay, as by the sea overflowing a depression of the land near the mouth of a river.

EOCENE - A epoch of the lower Tertiary period, after the Paleocene epoch and before the Oligocene epoch.

FOLIATED - A small scale structural term for a rock which exhibits a planar orientation of its platy minerals usually due to metamorphism.

FORMATION - The fundamental formal unit of classification according to lithology and stratification.

GUMBO - A term used locally in the U.S. for a clay soil that becomes sticky, impervious, and plastic when wet.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

HAS - Hazard Assessment Score - The score developed by utilizing the Hazardous Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions also found in OSHA and DOT rules.

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, physical, chemical, or infectious characteristics may

a. cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or
b. pose a substantial threat or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

LENTICULAR BEDDING - A form of interbedded mud and ripple cross-laminated sand, in which the ripples or lenses are discontinuous not only in the vertical but also in the horizontal direction.

LIGNITE - a brownish black coal that is intermediate in coalification between peat and subbituminous coal.

LITHOLOGY - The physical character of a rock (e.g., particle size, color, mineral content, primary structures, thickness, weathering characteristics, and other physical properties).

LOAM - Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

MARL - An old term loosely applied to a variety of materials, most of which occur as loose, earthy deposits consisting chiefly of an intimate mixture of clay and calcium carbonate, usually formed under freshwater conditions.

MIGRATION (Contaminant) - The movement of contaminants through pathways (e.g., ground water, surface water, soil, and air).

MIOCENE - An epoch of the upper Tertiary period, after the Oligocene and before the Pliocene.

PALEOCENE - An epoch of the early Tertiary period after the upper Cretaceous period and before the Eocene epoch.

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

PLEISTOCENE - An epoch of the Quaternary period, after the Pliocene of the Tertiary and before the Holocene.

PLIOCENE - An epoch of the Tertiary period after the Miocene and before the Pleistocene.

SHALE - A fine-grained detrital sedimentary rock formed by the consolidation of clay, silt, or mud.

SILTSTONE - An indurated (hardened or consolidated by pressure, cementation, or heat) silt having the texture and composition of shale but lacking its fine lamination.

STRATIFICATION - Structure produced by deposition of sediments in layers or beds.

STRATUM - A section of a formation that consists of approximately the same kind of rock material throughout. Also a layer (of sediment) that was spread out horizontally with older layers below and younger layers above.

SURFACE WATER - All water exposed at the ground surface, including streams, rivers, ponds, lakes, and drainage ditches.

TERTIARY - The first period of the Cenozoic era (after the Cretaceous of the Mesozoic era and before the Quaternary).

UPGRADIENT - A direction that is topographically or hydraulically up slope.

WATER TABLE - The upper limit of the portion of the ground that is wholly saturated with water.

WETLANDS - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

WILDERNESS AREA - Areas designated under federal or state laws as wilderness areas to be managed for their aesthetic or natural value.

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APPENDIX A

RESUMES OF ASG, INC. SEARCH TEAM MEMBERS

AUTOMATED SCIENCES GROUP, INC.

DAVID R. STYERS, P.E. - HEALTH PHYSICIST

PROFESSIONAL CAPABILITIES

Twelve years experience in program management that includes test planning, system design, training and management, research and development, and quality assurance/quality control. Expertise in radiation health physics that includes field surveys, safety reviews, hazard assessments, compliance reviews, and gamma spectroscopy (radiological chemical analyses). Conduct site surveys and records searches for Installation Restoration Program (IRP) for various Air National Guard bases. Efforts include risk assessment, site prioritization, and remedial action recommendations.

EDUCATION

M.S., Health Physics, Georgia Institute of Technology, Atlanta, 1985
Certified Professional Engineer in Civil Engineering
B.S., Education (Major, Chemistry, Minor, Physics), Slippery Rock College, Slippery Rock, PA, 1964

PROFESSIONAL EXPERIENCE

1987-Present Automated Sciences Group, Inc.
Health Physicist. Manage Tumulus Chemical and Nuclear Waste Disposal Task for ASG, including monitoring activities at Demonstration Site, SWSA-6. Prepare task implementation plans, maintain master schedule, and interface with clients at Oak Ridge National Laboratory. Active participation as a team member in Hazardous Waste Environmental Audits, Waste Minimization, and USAF Installation Restoration Program Projects.

1985-1987 Oak Ridge Associated Universities
Health Physics Team Leader. Directed on-site radiation survey teams throughout the United States; provided radiation safety assistance. Conducted complex radiological assays of samples; analyzed and interpreted data; prepared comprehensive reports of results. Reviewed safety procedures and engineering plans for decontamination of nuclear facilities and environmental impact documents. Conducted hazard assessments of radionuclides. Inspected operations and facilities for compliance with regulations.

1978-1985 Pennsylvania Department of Environmental Resources
Chemist. Performed qualitative and quantitative radioassay analyses by gamma spectroscopy techniques. Prepared and disposed of radioactive standards and samples in compliance with NRC regulations. Established quality control charts for radiation analyzers. Participated in quality assurance program of EPA's Environmental Surveillance Monitoring Laboratory; achieved 98% accuracy.

1974-1978 Pennsylvania Department of Transportation
Chemist. Supervised air monitoring section of Chemical Laboratory. Evaluated and selected test site locations for air monitoring projects;

trained staff in proper use of equipment. Scheduled laboratory and field testing. Designed mobile air monitoring vans. Prepared reports on air monitoring testing and research.

1968-1974 Pennsylvania Department of Transportation
Chemist. Supervised and performed qualitative and quantitative chemical monitoring activities.

1965-1968 Fairview Township Schools
Teacher. College preparatory Chemistry and Physics.

MEMBERSHIPS

American Nuclear Society
Health Physics Society

CLEARANCE

DOE-Q

AUTOMATED SCIENCES GROUP, INC.

RICHARD J. BURTNETT - PROJECT MANAGER QA ENGINEER

PROFESSIONAL CAPABILITIES

Over twenty years' experience in program/project management, including research and development, test planning, training and management, quality assurance/quality control, integrated logistic support, major system acquisition, and development and implementation of programs. Experience with site surveys and records searches for Installation Restoration Program (IRP) for Air National Guard bases.

EDUCATION

B.S., Education, University of North Dakota, 1957
B.S., Aerospace Safety Engineering, University of So. California, 1969
R&D Management Courses, U.S. Army

PROFESSIONAL EXPERIENCE

1986-Present Automated Sciences Group, Inc.
Project Manager/QA Engineer. Technical and program management for Quality Assurance program development and implementation and diversified waste management activities in support of the National Hazardous Waste Remedial Action Program, the Oak Ridge National Laboratory, and the USAF Installation Restoration Program.

1983-1986 Presearch Inc. and Burroughs Corporation
Project Manager/Senior QA Engineer. Supervised six engineers in development and execution of quality assurance program for Gas Centrifuge Enrichment Plant (GCEP) machine design and development, subassembly manufacturing, and machine assembly, performance, and testing. Planned, executed, and followed up activities for DOE quality assurance audits to determine adequacy of and adherence to established procedures. Responsible for development, update, and revision of DOE Quality Documentation in accordance with NQA-1 and MIL-STD-9858A. Planned nonconformance tracking system for the gas centrifuge machines.

1979-1983 Goodyear Atomic Corporation, Piketon, Ohio
QA Supervisor/Engineer in Recycle and Assembly Division of Union Carbide Nuclear Division, Oak Ridge. Developed operational methods/procedures for start-up and operation of the Recycle and Assembly Facility of Gas Centrifuge Enrichment Plant (GCEP). Developed and implemented programs for quality control, subassembly and machine testing, assembly operations, and nonconformance analysis. Conducted audits for Union Carbide. Assigned to Operating Contractors Project Office; represented DOE by interfacing with architect engineering firms, construction contractors, and operating contractors concerning

quality assurance matters (design reviews, non-conformance programs, quality assurance audits, and other procurement, construction, installation, and acceptance activities). Developed the organization, job descriptions, staffing levels, and program for the GCEP QA/QC Division.

1974-1979 Michelin Tire Co., Inc.

Manufacturing Manager. Directed preparation of raw materials and production of semi-finished rubber products for radial tires in automated facility with computerized electro-mechanical operations of heavy manufacturing equipment.

Training Manager. Developed and implemented training programs for startup and operation of $250 million automated rubber processing plant. Responsible for professional development of personnel. Responsible for disposal of toxic wastes in accordance with EPA standards.

1973-1974 Vectra Corporation (Standard Oil of California)

Managed spinning, extrusion, and draw twisting departments. Responsible for equipment maintenance, production, and quality control.

Prior U.S. Army (20 years)

Managed research and development and participated in procurement and deployment of specialized equipment/systems for U.S. Army and government agencies. Performed testing and evaluation of Army aircraft and aircraft systems.

Command assignments in infantry and fixed/rotary wing organizations.

AUTOMATED SCIENCES GROUP, INC.

T. WARD DILWORTH - ENGINEER

PROFESSIONAL CAPABILITIES

Combined background in Geology and Civil Engineering with emphasis on the geotechnical and environmental difficulties encountered in soil, rock, ground water, and similar hydrologic situations. Experience in preparation of proposals and technical reports and laboratory and field testing of soils and concrete. Assist in the conduct of site surveys and records searches for Installation Restoration Program (IRP) for various Air National Guard bases. Efforts include data compilation, risk assessment, site idetification, and site prioritization.

EDUCATION

B.A., Geology, University of Tennessee, 1984
B.S., Civil Engineering, University of Tennessee, 1987
Engineer In Training (E.I.T) Certification, State of Tennessee, 1987

PROFESSIONAL EXPERIENCE

1987 - Present Automated Sciences Group, Inc.

Engineer. Involved in Martin Marietta's site characterization investigations for the low-level waste disposal demonstration project. Duties encompass part of the ground-water characterization for the project and include monitoring ground-water levels on three sites, recording well details as they are finished, and transfer of collected data.

Also involved in development of ground-water computer modeling program. Assisted in survey of certain buildings at ORGDP to obtain information used to place those buildings in safe storage. Engaged in studies involving underground waste storage tanks, and assigned to five Preliminary Assessment projects for the Installation Restoration Program (IRP) for the Air National Guard Bureau (ANGB).

1986 - 1987 Law Engineering

Engineering Aide, Laboratory and Field Technician. Assisted senior engineering staff in preparation of technical reports and proposals. Checked field reports, prepared engineering drawings, and provided input on geologic considerations included in reports and proposals. Conducted laboratory and field tests on soil (in situ density, proctor test, freeze/thaw and wet/dry cycles on soil-cement samples, water content, and collecting bag samples) and concrete (compression testing of cylinders, making concrete cylinders, making grout cubes, slump testing, air content, density/unit weight). Assisted drilling crew in auger drilling operations and laying out borehole locations.

NATIONAL TECHNOLOGY CORPORATION

HARRY A. BRYSON - ENVIRONMENTAL SCIENTIST

PROFESSIONAL QUALIFICATIONS

Mr. Bryson is a graduate environmental engineer and certified hazardous materials manager with 6 years of full-time experience in the waste management and environmental remediation fields, principally with site problems involving chemical, radioactive, and mixed (chemical and radioactive) wastes. He also has an academic and work background in health physics as it relates to radioactive and mixed waste management, minimization, treatment, storage, and disposal. He is experienced in environmental regulation compliance with respect to hazardous and industrial solid wastes, radioactive wastes, radioactive mixed wastes, and industrial wastewater. Past work has included preparation of wastewater discharge and chemical and radioactive waste facility permits. Associated permit compliance activity has included site assessment and monitoring of air, surface water, and ground water for environmental assessment and risk analysis.

EDUCATION

- M.S., Environmental Engineering, University of Tennessee, Knoxville, Tennessee, 1984
- B.S., Engineering Physics, University of Tennessee, Knoxville, Tennessee, 1981
- M.S., General Biology, Butler University, Indianapolis, Indiana, 1979
- B.S., Life Sciences, USAF Academy, Colorado Springs, Colorado, 1971

EXPERIENCE AND BACKGROUND

1988-Present Manager, Environmental Engineering, National Technology Corporation, Oak Ridge, Tennessee. Project Manager/Environmental Engineer in investigations and engineering feasibility studies under RCRA and CERCLA for sites contaminated with chemical and radioactive constituents. Project team member for completion of RCRA Part B permits for incineration/detonation of waste explosives under 40 CFR 264, Subpart X.

1986-1988 Environmental Engineer, IT Corporation, Knoxville, Tennessee. Involvement as an environmental engineer, environmental scientist, and deputy project manager in a variety of site assessment, Remedial Investigation/Feasibility Study (RI/FS), and remedial action projects as well as other work dealing with hazardous, radioactive, and mixed waste management. Specific major projects

have included site PA/SIs and RI/FS/RDs under the U.S. Air Force Installation Restoration Program and the U.S. Army Corps of Engineers Defense Environmental Restoration Program. Commercial work has included remedial investigations and feasibility studies for CERCLA sites in North Carolina, South Carolina, and Florida. Work has included cost estimating, work plan preparation, sampling and QA/QC plan preparation, data evaluation and reporting, and development and evaluation of feasible remedial action options.

1986 Environmental Engineer, D.W. Weeter Associates, Knoxville, Tennessee. Projects dealing with waste oil, underground storage tanks, and wood preserving facilities. Duties included site environmental audits, permit applications, report preparation. Completed requirements for Certification Hazardous Material Manager (CHMM) at Masters Level, Certificate No. 930.

1983-1986 Environmental Engineer, Bechtel National, Inc. Oak Ridge, Tennessee. Specializing in hazardous, radioactive, and commingled waste management. Work was primarily for the U.S. Department of Energy's Formerly Utilized Sites Remedial Action Program (FUSRAP). Range of duties included development and evaluation of engineering plans for pollution abatement and remedial action; federal and state environmental regulations compliance (Clean Air and Clean Water Acts, RCRA); and environmental monitoring. Duties also include limited involvement with NEPA assessment, risk analysis, health physics, and geohydrology. Drafted formal technical correspondence and responses to questions from special/public interest groups.

1979-Present Instructor Pilot, KC-135E (Air National Guard version of Boeing 707/717 modified for aerial refueling of other aircraft), Tennessee Air National Guard, 134th Air Refueling Group at McGhee Tyson Airport. Maintained combat ready status under USAF strategic air command regulations. Logged approximately 4000 hours flying time and has a USAF Command Pilot rating and a FAA commercial pilot license (multiengine land) with a Boeing 707-720 type rating. Also the Chief, Command and Control Office (Command Post). Have a DOD Top Secret security clearance with a current Special Background Investigation (SBI). Additional duty as USAF Academy/USAF ROTC Admissions Liaison Officer for Knoxville, Tennessee area. Worked on an unofficial project to enhance group training for operations in nuclear/chemical/biological warfare environments. (From January 1979 to August 1983, also a full-time student at the University of Tennessee, Knoxville.)

1977-1978	Officer Controller, Strategic Air Command Unit (Base) Command Post. Shift supervisor in the Operations "nerve center" of a Strategic Air Command base. Primary base was war and/or disaster plan activation and coordination. Routine duties included monitoring and replanning flying missions, scheduling aircraft maintenance, and keeping the commander and his staff informed of anything that might affect the combat readiness of the base. Awarded the Air Force Commendation medal for this period of service. Duty Station: Grissom AFB, Indiana.
1975-1977	Aircraft Commander, KC-135A. Commanded an integral crew of four in the operations of a SAC aircraft in a variety of aerial refueling mission in the continental U.S., Alaska, Canada, and Europe. Certified for Top Secret nuclear and chemical operations. Also was the 305th Air Refueling Squadron Disaster Preparedness Officer. Responsible for the instruction of over 100 military personnel in "self preservation' in the event of natural or manmade disasters. Duty Station: Grissom AFB, Indiana.
1972-1975	Co-pilot, KC-135A. Second-in-command for the Aircraft Commander duties listed above. During this time, performed temporary flying duty in Thailand, Guam, and Canada. Duty Station: Grissom AFB, Indiana.
1972	Student Pilot, KC-135A. In three-month upgrade program. Duty Station: Castle AFB, California.
1971-1972	Student Pilot, Undergraduate Pilot Training. Completed the USAF basic flying courses in the T-41A, T-37A, and T-38A. Duty Station: Moody AFB, Georgia.

REGISTRATION/CERTIFICATION

Certified Hazardous Materials Manager (CHMM) - Masters Level, Certificate No. 930.

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Health Physics Society
Society for Risk Analysis
Water Pollution Control Federation
Academy of Hazardous Materials Manager

NATIONAL TECHNOLOGY CORPORATION

D. SUSAN CARR - ASSISTANT PROJECT ENGINEER

PROFESSIONAL CAPABILITIES

Over seven years experience as both field and office engineer for the Hazardous Waste Remedial Action Program (HAZWRAP) and Formerly Utilized Sites Remedial Action Program (FUSRAP).

EDUCATION

A.S., Civil Engineering, Roane State Community College, 1985

PROFESSIONAL EXPERIENCE

1988 - Present	National Technology Corporation Engineering Support Supervisor. Prepare proposals, technical reports and training manuals. Perform preliminary assessments, environmental monitoring, and site characterizations.
1987 - 1988	IT Corporation Assistant Project Engineer. Proposal preparation for HAZWRAP rebid. Managed database for the Mather Air Force Base RI/FS controlling over 20,000 prior/current sampling records. Performed groundwater, surface water, and sediment sampling for environmental monitoring purposes and for site characterizations.
1982 - 1987	Bechtel National, Incorporated Field Engineer/Technologist. Prepared subcontract packages for characterization and remediation of radiologically contaminated sites. Developed site assessment reports listing contamination type, source, and location by interviewing personnel and researching historic documents. Developed monitoring well matrices to track installation, testing, and maintenance or closure of monitoring wells at FUSRAP sites. Subcontract management including monitoring, inspection, approving, and documentation of subcontract work performance during four field assignments.
1980 - 1982	Tennessee Valley Authority Nuclear Pipe Support Designer. Designed ASME pipe support design using GTSTRUDL; implemented and maintained the FCR, FCN, FCO tracking system for Yellow Creek Nuclear Plant (YCNP).
1976 - 1980	BASF Fabrics Design Draftsman. Served in all positions of survey crew performing construction surveys. Performed civil, piping, structural, and mechanical drafting.
1974 - 1975	Enco Materials Steel Detailer. Prepared steel placement drawings for concrete reinforcing steel.

APPENDIX B

OUTSIDE AGENCY CONTACT LIST

Contact List for Local, State, and National Agencies

Mississippi Department of Natural Resources
Bureau of Geology
2525 North West Street
P.O. Box 5348
Jackson, MS 39216
(601) 354-6228

Information obtained: Geologic, hydrologic, and hydrogeologic reports, maps, and cross sections.

U.S. Geological Survey, Water Resources Division
100 West Capitol Street
Jackson, MS 39269
(601) 965-5587 (Mike Mallory)

Information obtained: WATSTORE/GWSI computer printout of wells located within 3 miles of the Gulfport Air National Guard Training Site.

National Climatic Data Center
Federal Building
Asheville, NC 38801
(704) 259-0682

Information obtained: Climate/meteorological information.

Soil Conservation Service
Harrison County Soil and Conservation District
2315 17th Street, Room 14
Gulfport, MS 39501
(601) 863-1375

Information obtained: Soil Survey of Harrison County, MS.

Gulfport Water and Sewer
Engineering
4050 Hughes Avenue
Gulfport, MS 39507
(601) 868-5792

Information obtained: Listing of wells owned and operated by Gulfport Water and Sewer as well as physical/chemical analyses of these wells.

APPENDIX C

USAF HAZARD ASSESSMENT RATING METHODOLOGY

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is as follows:

> To develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF), using information gathered during the Preliminary Assessment phase of its Installation Restoration Program (IRP), has sought to establish a system of priorities for taking actions at identified sites.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites suspected of contamination from hazardous substances. This model will assist the Air National Guard in setting priorities for follow-on site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (i.e., hazardous wastes are present in sufficient quantity) and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like other hazardous waste site ranking models, the U.S. Air Force site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Preliminary Assessment portion of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form and the rating factor guideline are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by specific sites: possible receptors of the contamination, the waste and its characteristics, the potential pathways for contamination migration, and any efforts that were made to contain the wastes resulting from a spill.

The receptors category rating is based on four rating factors: the potential for human exposure to the site, the potential for human ingestion of contaminants should underlying aquifers be polluted, the current and anticipated uses of the surrounding area, and the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1000 feet of the site and the distance between the site and the Base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the ground-water use of the uppermost aquifer, and population served by the ground-water supply within three miles of the site. The uses of the surrounding area are determined by the zoning within a one mile radius. Determination of whether or not critical environments exist within a one mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The

maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptor subscore = (100 x factor score subtotal/maximum score subtotal).

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways: surface-water migration, flooding, and ground-water migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned; and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factory to the sum of the scores for the other three categories.

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 mile	1 to 3 mile	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered species; threatened species; presence of recharge area; major wetlands	10

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

	Rating Scale Levels				
Rating Factors	0	1	2	3	Multiplier
F. Water quality / use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Ground-water use of uppermost aquifer	Not used, other sources readily available	Commercial, industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available, commercial, industrial, or irrigation, no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-50	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Scale Levels

Rating Factors	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability, and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

II. WASTE CHARACTERISTICS - Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:

Confidence Level

- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating
- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard rating can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net Precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year 24-hour rainfall (no. of thunderstorms annually)	<1.0 inch (0-5)	1.0 to 2.0 inches (6-35)	2.1 to 3.0 inches (36-49)	>3.0 inches (>50)	8

B-2 Potential for Flooding

Rating Factors	Rating Scale Levels: 0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Ground-Water Contamination

Rating Factors	Rating Scale Levels: 0	1	2	3	Multiplier
Depth to ground water	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($<10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($>10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor
The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/Water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete, the factor ratings under items I-A through I, III-B-1, or III-B-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX D

SITE HAZARDOUS ASSESSMENT RATING FORMS AND FACTOR RATING CRITERIA

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Gulfport ANG Field Training Site - Site No.1

Location West of Runway 13/31 and adjacent to Taxiway 1

Date of Operation or Occurrence 1972 to Present

Owner/Operator GFTS

Comments/Description Fire Training Area

Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft of site	1	4	4	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	2	10	20	30
F. Water quality of nearest surface water body	1	6	6	18
G. Groundwater use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	3	6	18	18
Subtotals			114	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 63

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

100 x 0.9 = 90

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

90 x 1.0 = 90

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	68	108

Subscore (100 x factor score subtotal/maximum score subtotal) 63

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	0	8	0	24
		Subtotals	76	114

Subscore (100 x factor score subtotal/maximum score subtotal) 67

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	63
Waste Characteristics	90
Pathways	80

Total 233 divided by 3 = 78
Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

78 x .95 = 74

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Gulfport ANG Field Training Site - Site No. 2
Location Mill Road near Bayou Bernard
Date of Operation or Occurrence 1954 to Present
Owner/Operator GFTS
Comments/Description Bulk Aviation Fuel Storage Facility on Mill Road
Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	1	9	9	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground water supply within 3 miles of site	3	6	18	18
Subtotals			132	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 73

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

60 x .9 = 54

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

54 x 1.0 = 54

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	60	108

Subscore (100 x factor score subtotal/maximum score subtotal) 56

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	0	8	0	24
		Subtotals	76	114

Subscore (100 x factor score subtotal/maximum score subtotal) 67

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

V. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	73
Waste Characteristics	54
Pathways	80

Total 207 divided by 3 = 69
Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

69 x .95 = 66

HAZARDOUS ASSESSMENT RATING FORM

ame of Site Gulfport ANG Field Training Site - Site No. 3
ocation East of the Motor Pool, Building 68
ate of Operation or Occurrence 1954 - Present
wner/Operator GFTS
omments/Description Above-ground diesel fuel storage tank, Bldg. 68
ite Rated By Automated Sciences Group, Inc.

. RECEPTORS

ating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
. Population within 1,000 ft of site	3	4	12	12
. Distance to nearest well	3	10	30	30
. Land use/zoning within 1 mile radius	3	3	9	9
. Distance to installation boundary	3	6	18	18
. Critical environments within 1 mile radius of site	2	10	20	30
. Water quality of nearest surface water body	1	6	6	18
. Groundwater use of uppermost aquifer	1	9	9	27
. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
. Population served by groundwater supply within 3 miles of site	3	6	18	18
		Subtotals	122	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 68

I. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	3	8	24	24
		Subtotals	68	108
Subscore (100 x factor score subtotal/maximum score subtotal)				63

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	0	1	0	3
Subscore (100 x factor score/3)				0

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
		Subtotals	68	114
Subscore (100 x factor score subtotal/maximum score subtotal)				60

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	68
Waste Characteristics	72
Pathways	80

Total 220 divided by 3 = 73
Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

73 x 0.95 = 70

Gulfport Air National Guard Field Training Site
Gulfport - Biloxi Regional Airport
Gulfport, Mississippi
USAF Hazard Assessment Rating Methodology
Rating Factor Criteria

The following is a summary and explanation of the rating factor criteria used to score the Base sites under HARM. Several of the factors in the receptors and pathway categories are the same for each of the rated sites and are therefore stated only once. In those instances where a rating factor varies according to a specific site, the factor may be addressed separately for each of the respective sites.

I. RECEPTORS

A. Population Within 1000 Feet Of Site. Factor Rating 3: Site Nos. 2 and 3. There are greater than 100 persons within 1000 feet of each of these rated sites. Factor Rating 1: Site No. 1. There are estimated to be 1 to 25 people within 1000 feet of this site.

B. Distance To Nearest Well. Factor Rating 3. According to well records for Harrison County, there is a water well within 1000 feet of each site.

C. Land Use/Zoning (Within One Mile Radius). Factor Rating 3. Residential land use is prominent within one mile of the sites.

D. Distance To Installation Boundary. Factor Rating 3. All of the sites are either within 1000 feet of the installation boundary or are outside the Base boundary.

E. Critical Environments (Within One Mile Radius Of Site). Factor Rating 3: Site No. 2. This Site is located on the edge of Bayou Bernard which is flanked with wetlands along each bank. Factor Rating 2: Site Nos. 1 and 3. These Sites are within one mile of some small wetland areas.

F. Water Quality/Use Designation of Nearest Surface Water Body. Factor Rating 1. The nearest surface water bodies in the vicinity of the Base are used for recreation and for fish and wildlife propagation.

G. Ground-water Use of Uppermost Aquifer. Factor Rating 1. The uppermost aquifer is used primarily for commercial, industrial, or irrigation purposes. Although many of these wells are privately owned, they are used for watering lawns so as to avoid the cost of using public water for their lawns.

H. Population Served By Surface Water Supplies Within 3 Miles Downstream of The Site. Factor Rating 0. There was no evidence to indicate that the surface waters within 3 miles downstream of the Base are used as drinking water sources by any person.

I. Population Served By Aquifer Supplies Within 3 Miles Of The Site. Factor Rating 3. The local municipality supplies the drinking water in the vicinity of the Training Site using ground water from municipal wells.

II. WASTE CHARACTERISTICS

Site No.1:

- A-1: Hazardous Waste Quantity - Factor Rating L. It was estimated that up to 130,000 gallons of waste may have infiltrated into the ground over the 16-year time period that this site has been in use.

- A-2: Confidence Level - Factor Rating C. This is based on the knowledge of the known types of materials used at this site.

- A-3: Hazard Rating - Factor Rating H. The hazard rating at this site is based on JP-4 toxicity. JP-4 has a Sax toxicity of 3 which corresponds to a HARM hazard rating of 3.

Site No. 2:

- o A-1: Hazardous Waste Quantity - Factor Rating S. It was estimated that up to 610 gallons of waste may have infiltrated into the ground at this site over the 45-year time period that this site was in use.

- o A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- o A-3: Hazardous Rating - Factor Rating H. See Site No. 1, Section A-3.

Site No. 3:

- o A-1: Hazardous Waste Quantity - Factor Rating M. It was estimated that up to 3400 gallons of waste may have infiltrated into the ground at this site over the 34-year time period that this site has been in use.

- o A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- o A-3: Hazardous Rating - Factor Rating H. See Site No. 1, Section A-3.

For All HARM Rated Sites:

B. Persistence Multiplier - Factor Rating 0.9. JP-4, heating oil, and diesel fuel fall within the category of substituted and other ring compounds.

C. Physical State Multiplier - Factor Rating 1.0. The materials released at each site were in a liquid state.

III. PATHWAYS CATEGORY

A. Evidence of Contamination.

Site Nos. 1 - 3: Factor Rating 80 - Indirect Evidence. There was visible evidence of ground staining at each of these sites.

B-1 Potential for Surface Water Contamination

- Distances to Nearest Surface Water (includes Drainage Ditches and Storm Sewers): Factor Rating 3. Each of the identified sites at the Training Site are within 500 feet of surface water.

- Net Precipitation: Factor Rating 2. Net precipitation at the Training Site is +5 to +20 inches per year.

- Soil Erosion:

  Site Nos. 1 and 3: Factor Rating 1. There were visible signs of slight erosion at these sites.

  Site No. 2: Factor Rating 0. This site showed no signs whatsoever of erosion.

- Surface Permeability: Factor Rating 0. All of these sites are located in soils that generally have less than 15 to 30% clay content.

- Rainfall Intensity Based On One-Year, 24 Hour Rainfall: Factor Rating 3. The one-year, 24-hour rainfall value is greater than 5.0 inches.

B-2 Potential for Flooding: Factor Rating 0: Sites Nos. 1 and 3. According to the Flood Insurance Rate Map (FIRM) for the National Flood Insurance Program, the Training Site does not lie within a 100-year floodplain. Factor Rating 1: Site No. 2. The Bulk Aviation Fuel Storage Facility on Mill Road does lie within a 100-year floodplain.

B-3 Potential for Ground-water Contaminations.

- Depth to ground water: Factor Rating 3. Training Site records and past excavations on the Training Site indicate a shallow water table of less than 10 feet in most places.

- Net Precipitation: Factor Rating 2. See B-1.

- Soil Permeability: Factor Rating 3. The average clay content in the soil is less than 15%.

- Subsurface Flows:

  Site No. 3: Factor Rating 1. This site may occasionally become submerged.

  Sites No. 1 and 2: Factor Rating 2. These sites may become submerged quite frequently.

- Direct Access To Ground water: Factor Rating 0. There is no evidence of direct access to ground water at any of the sites.

IV. WASTE MANAGEMENT PRACTICES CATEGORY

Waste Management Factor Multiplier. Factor Rating 0.95. All of the sites have limited containment (berms) but no monitoring wells.

APPENDIX E

STORAGE TANK SURVEY

GULFPORT AIR NATIONAL GUARD

FIELD TRAINING SITE

GULFPORT, MISSISSIPPI

STORAGE TANK SURVEY

This appendix is a general survey of the storage tanks on the Gulfport ANG Field Training Site at Gulfport-Biloxi Regional Airport. The following table lists their location, size, age, contents, and building of facility served.

Storage Tank Listing for Gulfport ANG Field Training Site
Gulfport, Mississippi

Facility Number	Fuel/Waste Type	Capacity (Gallons)	Contents	Age	Remarks
99	JP-4	440,000	JP-4	33	Above ground - Bayou Bernard
131	Diesel	2000	Water	12	Underground; used once - Abandoned - 1978
200	Diesel	5000	Diesel	34	Above ground, east of Bldg. 68
247	MOGAS	10,000	Gasoline	6	Underground, east of Bldg. 68
248	MOGAS	10,000	Gasoline	6	Underground, east of Bldg. 68
Fire Pit	Waste Fuel	2000	Waste Fuel	16?	Above ground
	Waste Fuel	1800	Waste Fuel	7	Above ground
67	Hydraulic Fluid	20	Hydraulic Fluid	?	Above ground
	Motor Oil	100	Motor Oil	?	Above ground
	Antifreeze	55	Antifreeze	?	Above ground
	Waste Oil	500	Waste Oil	3	Underground
133	Hydraulic Fluid	3	Hydraulic Fluid	?	Above ground
	Motor Oil	150	Motor Oil	?	Above ground
	Waste Oil	500	Waste Oil	11	Underground
120	Hydraulic Fluid	5	Hydraulic Fluid	?	Above ground
	Motor Oil	100	Motor Oil	?	Above ground
	Solvent	55	Solvent	?	Above ground

The following are currently being utilized by the MS Army National Guard's Aviation Classification Repair Activity Depot (AVCRAD). These tanks will be included in the U.S. Army/ARNG investigation to be conducted in 1988-1989.

Facility Number	Fuel/Waste Type	Capacity (Gallons)	Contents	Age	Remarks
Paint Hangar	Paint Stripper	825	Solvent	?	Above ground
	Epoxy Stripper	30	Solvent	?	Above ground
	Waste Paint	500	Waste Paint	?	Above ground
	Epoxy Stripper	25	Solvent	?	Above ground
	Solvent	125	Solvent	?	Above ground
	Lube Oil	25	Oil	?	Above ground
	Paint Stripping	20,000	Paint/Solvent Wastes	?	Underground
69	Dry Cleaning Solvent	500	Cleaning Solvent	?	Above ground
	POL Products	500	Waste POL	?	Above ground
	Contaminated Solvents	100	Solvents	?	Above ground
	Solvents	1000	Solvents	?	Above ground

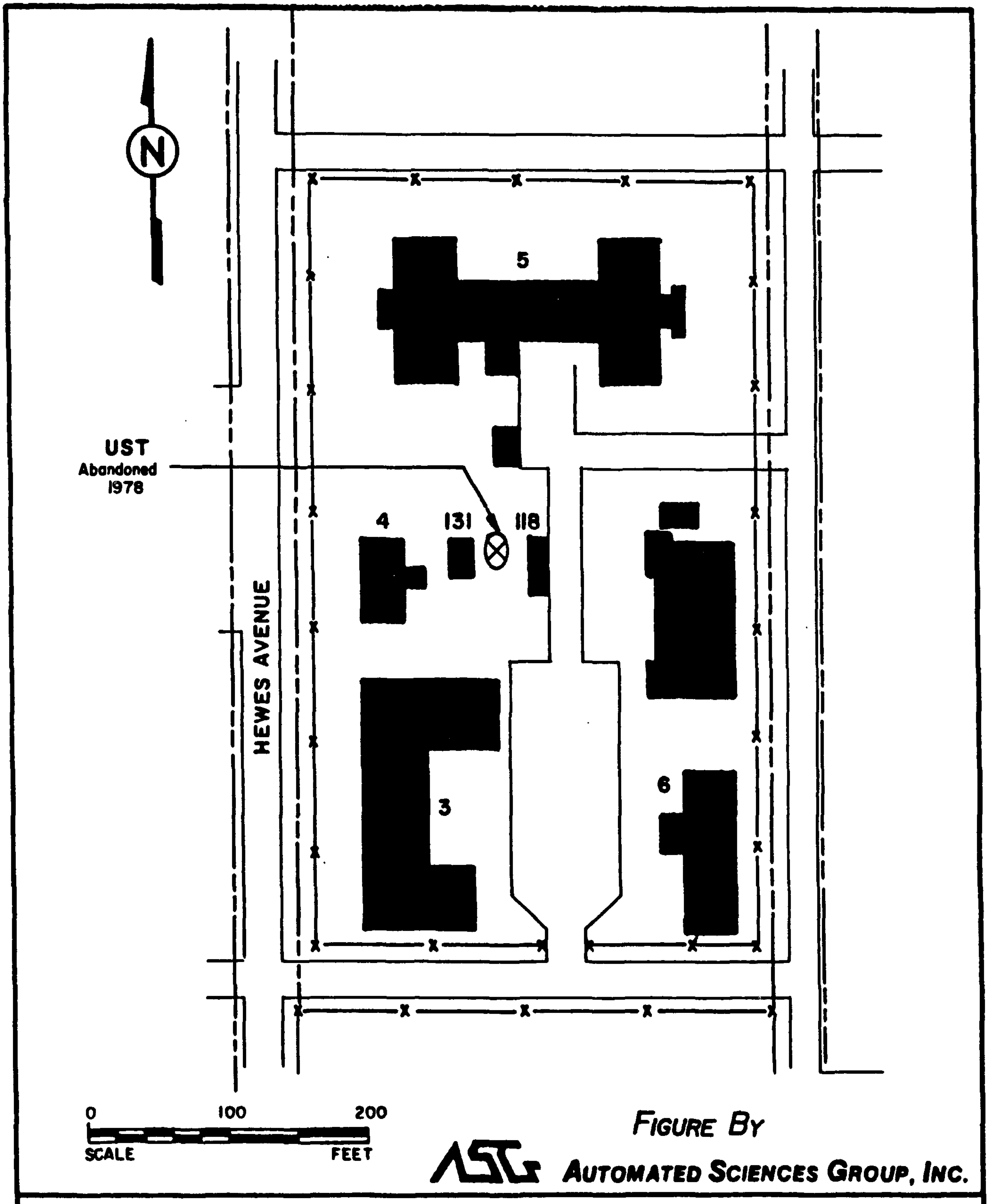

Figure 10. Location Map of Abandoned UST East of Building 131 at the Air National Guard Field Training Site, Gulfport, Mississippi (1988).

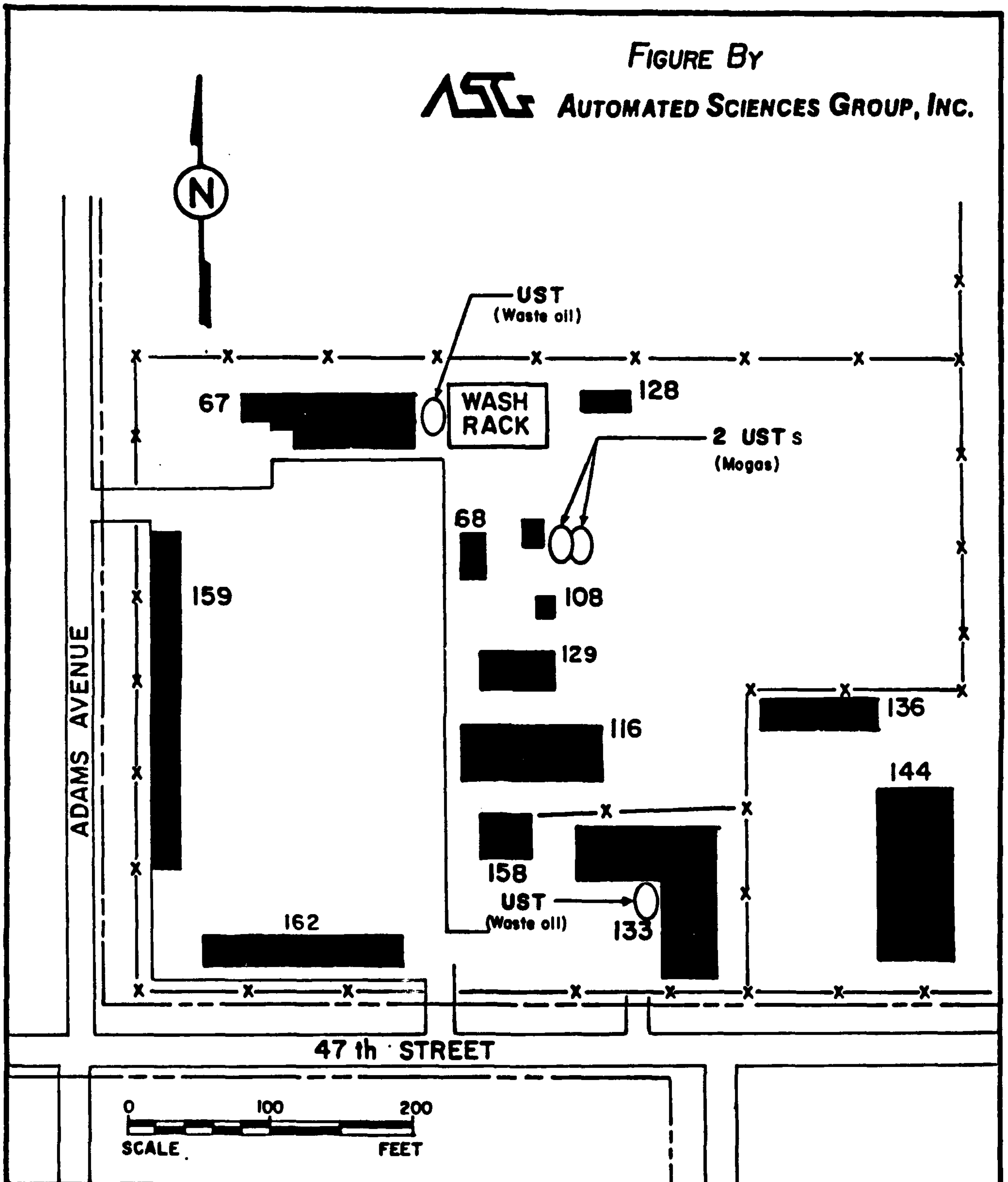

Figure 11. Location Map of USTs In Use at the Air National Guard Field Training Site, Gulfport-Biloxi Regional Airport, Gulfport, Mississippi (1988).

APPENDIX F

SUBSURFACE SOIL DATA

GULFPORT AIR NATIONAL GUARD

FIELD TRAINING SITE

GULFPORT, MISSISSIPPI

SUBSURFACE SOIL DATA AT THE
GULFPORT ANG FIELD TRAINING SITE,
GULFPORT, MISSISSIPPI

So as to provide soil data specific to the Training Site itself, the following soil borings logs are included. These two borings were performed by Thompson Engineering Testing, Inc. on 14 January 1986 as part of a road repair project for the roads around the dorm area of the Training Site. These borings were drilled to a depth of 6.3 feet below the surface and illustrate the types of material encountered in the area. These borings are located west of Adams Avenue. Boring B-1 is approximately 100 feet south of the southeast corner of dorm Building number 7. Boring B-2 is about 10 feet south of the southeast corner of dorm building number 10.

THOMPSON ENGINEERING TESTING, INC.
ENGINEERS TESTING LABORATORIES
MOBILE, ALABAMA BILOXI, MISSISSIPPI

TEST BORING LOG

CLIENT: Gulf South Engineers, Inc. GROUND ELEVATION: ---

PROJECT: Repair Roads - Dorm Area
Air National Guard Training Center
DATUM: Top of Existing Pavement

JOB NO.: E86-004 DATE DRILLED: 1/14/86 GR. WATER DEPTH: 4.5'

BORING NO.: B-1 LOCATION: See Test Location Plan TYPE BORING: ASTM D-1586

DEPTH IN FEET	DESCRIPTION	NO.	BLOWS PER FT. NO	% W.C.	ATTERBERG LIMITS L.L.	P.I.	USCS	% PASSING NO. 200 SIEVE
0	3.5" Asphalt							
	3" SAND Shell Base			4.8	Non-Plastic		-	10.2
	FIRM fine to medium gray SILTY SAND			7.3	Non-Plastic		SM	40.8
2		1	15					
	Very LOOSE fine tan, orange, and gray SILTY SAND	2	4	16.7	18.9	2.8	SM	19.3
5	FIRM fine tan and gray CLAYEY SAND	3	22	19.0	28.4	10.5	SC	19.0
	B.T. @ 6.3'							

THOMPSON ENGINEERING TESTING, INC.
ENGINEERS TESTING LABORATORIES
MOBILE, ALABAMA BILOXI, MISSISSIPPI

TEST BORING LOG

CLIENT: Gulf South Engineers, Inc. GROUND ELEVATION: ---

PROJECT: Repair Roads - Dorm Area
Air National Guard Training Center DATUM: Top of Existing Pavement

JOB NO.: E86-004 DATE DRILLED: 1/14/86 GR. WATER DEPTH: 3.0'

BORING NO.: B-2 LOCATION: See Test Location Plan TYPE BORING: ASTM D-1586

DEPTH IN FEET	LOG	SAMPLE	DESCRIPTION	NO.	BLOWS PER FT. NO	% W.C.	ATTERBERG LIMITS L. L.	P. I.	USCS	% PASSING NO. 200 SIEVE
0			3" Asphalt							
			4" Orange SAND CLAY Gravel							
1			DENSE fine brown and tan SILTY SAND							
2				1	31					
3			FIRM fine tan SILTY SAND							
4				2	29	14.4	Non-Plastic		SM	18.3
5			FIRM fine gray, tan, and orange SILTY SAND							
6				3	18					
			B.T. @ 6.25'							